PMC 1262

ENTHONE
INCORPORATED

MATERIAL SAFETY DATA SHEET

RECEIVED
DEC 10 1987
INDUSTRIAL HYGIENE

ENDOX® 214

P.O. BOX 1900
NEW HAVEN, CT 06508

EMERGENCY PHONE NUMBERS				PRODUCT CODE#:	2711
PLANTS	203-934-8611	(8:30am-5pm	EST)	DATE ISSUED:	8/24/87
	312-598-3210	(8:30am-5pm	CST)	SUPERCEDES:	3/87
MFSA	313-644-5626	(24 hours)		PREPARER:	F.R. Hirtler FRH
CHEMTREC	800-424-9300	(Transportation)			

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Sodium hydroxide *Ceiling value	Caustic soda	1310-73-2	2mg/m3	2mg/m3*	>40
Sodium cyanide +As CN		143-33-9	5mg/m3+	5mg/m3+	>30

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	NI	BOILING POINT, °F	NA
EVAP.RATE (BUTYL ACETATE=1)	NA	MELTING POINT, °F	NI
VAPOR PRESSURE, mmHg	NA	SOLUBILITY IN WATER	essentially complete
VAPOR DENSITY (AIR=1)	NA	APPEARANCE	white powder
pH (AS IS)	NA	ODOR	caustic, cyanide

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[ ] Not Combustible [X] Water fog or spray [ ] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear self-contained breathing apparatus (SCBA) and complete personal protective equipment when potential for exposure to vapors or products of combustion exists.

UNUSUAL FIRE AND EXPLOSION HAZARDS

In the presence of water, material may react with amphoteric metals (such as aluminum, zinc, or tin) generating hydrogen gas which will burn or explode if ignited.
Excessive heat may generate highly toxic and flammable hydrogen cyanide. Sodium cyanide dissolves readily in water; run off should be contained in order to avoid environmental or safety problems.

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V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Inhalation of dust may be fatal and can cause severe burns to upper respiratory tract.

INGESTION: May be fatal. Causes burns to mouth, throat, esophagus and stomach.

SKIN: Absorption through skin may be fatal. May cause irritation, rash.

EYES: Causes severe burns with damage to eyes and possible blindness.

EFFECTS OF CHRONIC EXPOSURE:

Eye and skin irritation, rash, blurring of vision, nausea, weakness and vomiting.

CARCINOGEN: Not listed by NTP, IARC, OSHA

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove victim to fresh air. If victim is unconscious and not breathing, resuscitate and administer antidote as prescribed by your company First Aid procedure. If conscious, administer oxygen and if necessary antidote as prescribed by your company first aid procedure (see pg. 4 section IX). Keep victim quiet and warm. Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person. Give victim suitable antidotes while administering oxygen. Follow company procedures concerning administration of antidotes, or water, and inducing vomiting. Seek immediate medical attention.

SKIN: Wash skin to remove cyanide while removing all contaminated clothing, including shoes. Do not delay. Skin absorption can occur from cyanide dust, solutions, or HCN vapor. Seek immediate medical attention.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage. Seek immediate medical attention.

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VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:

Do not inhale dust. Avoid contact with skin, eyes and clothing. Wear protective equipment. Sweep or shovel into clean container and cover. Flush spill area with dilute solution of sodium or calcium hypochlorite. Dispose of according to Local, State and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:

Store in a cool, dry place. Keep away from acids and organic compounds. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:

Wash thoroughly after handling. Decontaminate clothing before disposal.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Self-contained breathing apparatus is preferred.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [ ] Natural rubber Other: Butyl rubber

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Chemically resistant coveralls, hat and shoes or boots. Emergency eye-wash fountain and safety shower as well as cyanide antidotes should be available (see pg. 4 section IX)

WORK/HYGENIC PRACTICES:

Do not consume, handle or store food, beverages or tobacco in areas where this product is present. Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:

For waste disposal of operating solutions consult Enthone Waste Disposal Procedures. For major spills consult Enthone for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID: Moisture, heat
	Unstable	

INCOMPATABILITY (Materials to avoid): Oxidizing agents, acids, acid salts.

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic and flammable hydrogen cyanide, also oxides of carbon.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

It is highly recommended that procedures be established by your company's physician, concerning First Aid and Medical Treatment to be used in case of cyanide poisoning. Such procedure may include the administration of antidotes such as Amyl Nitrite, Sodium Thiosulfate, Sodium Nitrite, Methylene Blue and the like by qualified personnel.

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

UTCIHL 10

MATERIAL SAFETY DATA SHEET

RECEIVED
JUL 24 1986
INDUSTRIAL HYGIENE

PMC 1262

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ENTHONE, INC.	(203) 934-8611
ADDRESS *(Number, Street, City, State, and ZIP Code)* P. O. Box 1900, New Haven, CT 06508	
CHEMICAL NAME AND SYNONYMS N/A	**TRADE NAME AND SYNONYMS** Endox 214
CHEMICAL FAMILY N/A	**FORMULA** N/A

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Sodium Hydroxide	< 50	2 mg/M^3
Sodium Cyanide	< 40	5 mg/M^3
Balance of materials are non-hazardous		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER	very soluble		

APPEARANCE AND ODOR White powder with odor of caustic and cyanide

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None			

EXTINGUISHING MEDIA Not flammable

SPECIAL FIRE FIGHTING PROCEDURES Avoid using water on the product. The use of water will generate large quantities of the heat by reaction with the sodium hydroxide & may cause spattering. Use of water will dissolve the sodium cyanide & may thus spread the cyanide into sewers or drains where acid conditions may cause the liberation of highly toxic HCN.

UNUSUAL FIRE AND EXPLOSION HAZARDS Contact of the product with water may cause liberation of small amounts of toxic HCN which will be destroyed in a flaming fire. Heat may release volatile HCN which is very poisonous. Contact of the product with acids, acid salts, or acidic rinses liberates highly toxic and flammable HCN gas. In water solution, product may react with metals to generate hydrogen gas which is flammable.

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Rev. May 72

(Continued on reverse side)

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SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
N/A

EFFECTS OF OVEREXPOSURE
May be fatal if swallowed or if dust or mist from solution is inhaled. Inhalation of highly toxic hydrocyanic acid, generated by contact of the product with acid, may be fatal. Product may cause severe skin and eye burns.

EMERGENCY AND FIRST AID PROCEDURES Always have on hand cyanide antidote kits and Amyl Nitrite. External - Flush skin or eyes with plenty of cool water for 15 mins. while removing contaminated clothing and shoes; for eyes also get immediate medical attention. Inhalation - Remove patient to fresh air. Have patient lie down and keep warm. If breathing has stopped apply artificial respiration. Administer amyl nitrite by inhalation for ½-½ of every minute. Apply oxygen if available. Summon an ambulance to take patient to hospital. Cyanide Antidote Kit should accompany patient in ambulance.

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE Shelf life 1 yr.		

INCOMPATABILITY *(Materials to avoid)*
Moisture, oxidizers, acids, (very important)

HAZARDOUS DECOMPOSITION PRODUCTS
In a fire - toxic HCN, cyanogen, CO, CO_2, carboxylic acids

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	x	Unless subjected to high heat or contact with acids

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Stay upwind. Keep acid away from area. Do not breathe gas, dust or mist from product or solutions. Avoid contact with skin, eyes & clothing. Keep product dry if at all possible. Contain spill! Prevent material from getting into waters or into sewers. If spilled into waters or sewers, notify proper authorities immediately. If in solution prevent contact with metals as hydrogen may be generated.

WASTE DISPOSAL METHOD For spills and leaks: If material is in dry state shovel up into steel containers, sweep up all powder, dam area & treat residual with sodium hypochlorite to destroy remaining cyanide. If material is in solution, contain spill & absorb on sand, gravel. Shovel up into steel containers. Take solids to chemical waste treatment facility for chlorination to destroy cyanide.

For Waste Disposal of Operating Solution, Consult Enthone Operating Instructions.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* Type for caustic mist

VENTILATION		
	LOCAL EXHAUST Yes, for operating solution Endox 214	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES	EYE PROTECTION
Yes, rubber	Yes, goggles

OTHER PROTECTIVE EQUIPMENT Apron

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Keep dry; store indoors at max. of 120°F.; avoid contact with moisture, oxidizers, acids.

OTHER PRECAUTIONS
Avoid dust inhalation. Wear gloves, apron, goggles at all times when handling. Avoid all contact with acids or acidic materials as such contact will release poisonous gas. Avoid contact of the powder with oxidizing agents as violent reaction may occur.

ISSUED: 12/83 (retyped)
SPSDS: 12/78

PMC1505

DU PONT

MATERIAL SAFETY DATA SHEET

IDENTIFICATION

NAME
Sodium Cyanide

GRADE
CYANOBRIK*; CYANOGRAN*; Compounders Grade

SYNONYMS
Cyanide of Sodium; Prussiate of Soda

CAS NAME
Sodium Cyanide

I.D. NOS./CODES
NIOSH Registry No. VZ7525000

MANUFACTURER/DISTRIBUTOR
E. I. du Pont de Nemours & Co. (Inc.)

ADDRESS
Wilmington, DE 19898

CHEMICAL FAMILY
Alkali Metal Cyanide

FORMULA
NaCN

CAS REGISTRY NO.
143-33-9

TSCA INVENTORY STATUS
Reported/Included

PRODUCT INFORMATION PHONE
(800) 441-9442

MEDICAL EMERGENCY PHONE
(800) 441-3637

TRANSPORTATION EMERGENCY PHONE
Du Pont Cyanide HOTLINE
(For emergencies only)
(901) 357-1546
CHEMTREC (800) 424-9300

*Reg. U. S. Pat. & Tm. Off., Du Pont Company. CYANOBRIK(R) and CYANOGRAN(R) Sodium Cyanide are made only by Du Pont.

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PHYSICAL DATA

BOILING POINT, 760 mmHg
1496°C (2725°F)

MELTING POINT
564°C (1047°F)

SPECIFIC GRAVITY
1.6

VAPOR PRESSURE
Negligible

VAPOR DENSITY
Not volatile

SOLUBILITY IN WATER
37% at 20°C (68°F)

pH INFORMATION
11.3 to 11.7 (Typical for 5 to 25% solutions with no pH adjustment)

EVAPORATION RATE (BUTYL ACETATE = 1)
Not applicable

FORM
Solid

APPEARANCE
Granular or Briquettes

COLOR
White

ODOR
None (but can have slight ammonia and/or HCN odor if damp)

HAZARDOUS COMPONENTS

MATERIAL(S)	CAS NO.	APPROXIMATE %
Sodium Cyanide	143-33-9	100

HAZARDOUS REACTIVITY

INSTABILITY
Very stable when dry.

INCOMPATIBILITY
Large amounts of highly toxic, flammable hydrogen cyanide (HCN) gas will be evolved from contact with acids. Reacts violently with strong oxidizing agents. Water or weak alkaline solution can produce dangerous amounts of HCN in confined areas.

DECOMPOSITION
Moisture will cause slow decomposition, releasing poisonous HCN and ammonia gas.

POLYMERIZATION
Will not occur.

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FIRE AND EXPLOSION DATA

FLASH POINT
Will not burn.

FLAMMABLE LIMITS IN AIR, % BY VOL.
LOWER Not applicable.
UPPER Not applicable.

AUTOIGNITION TEMPERATURE
Not applicable.

FIRE AND EXPLOSION HAZARDS
Will not burn. Sodium cyanide will not be destroyed in an ordinary fire involving combustible materials such as paper or wood.

EXTINGUISHING MEDIA
Use water on fires near sodium cyanide, but minimize amount of water if containers are opened or burned (see "Incompatibility", above). DO NOT use carbon dioxide (CO_2) which reacts with sodium cyanide to produce hydrogen cyanide if moisture is present.

SPECIAL FIRE FIGHTING INSTRUCTIONS
Sodium cyanide dissolves readily in water; therefore, cyanide solution runoff may occur if containers are opened or burned. Runoff should be contained to avoid environmental or safety problems. Contained cyanide solution can be detoxified with hypochlorite.

HEALTH HAZARD INFORMATION

PRINCIPAL HEALTH HAZARDS (Including Significant Routes, Effects, Symptoms of Over-Exposure, and Medical Conditions Aggravated by Exposure)

May be fatal if inhaled, swallowed, or absorbed through skin. Contact with acids or weak alkalis liberates poisonous gas. Causes eye burns and may irritate skin.

Oral LD_{50}: 15 mg/kg in rats

Toxic effects described in animals from exposure by inhalation, ingestion, or skin contact include asphyxia, dyspnea, ataxia, tremors, coma, and lethality by disrupting oxidative metabolism. Tests in bacterial and mammalian cell cultures demonstrate no mutagenic activity. Tests in some animals indicate that the compound may affect the fetus, that is, it may be a developmental toxin.

Human health effects of overexposure by inhalation, ingestion, or skin or eye contact may initially include: skin irritation with discomfort or rash, eye irritation or burns with discomfort, tearing, or blurring of vision, and possible permanent eye damage; and nonspecific discomfort such as nausea, headache, dizziness, vomiting, and weakness. Higher exposures may lead to these effects: rapid respiration; lowered blood pressure; unconsciousness; convulsions; and fatality. Evidence suggests that significant skin permeation can occur. Individuals with preexisting diseases of the central nervous system may have increased susceptibility to the toxicity of excessive exposures.

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CARCINOGENICITY

Not listed as a carcinogen by IARC, NTP, OSHA, ACGIH, or Du Pont.

EXPOSURE LIMITS [PEL (OSHA), TLV (ACGIH), AEL (DU,PONT), ETC.]

The OSHA 8-hour Time Weighted Average (TWA) and ACGIH TLV(R)-TWA are 5 mg/m^3, as CN. Both carry a "skin" notation indicating that cyanide may penetrate the skin (especially if the skin is broken). Control of vapor, dust, and mist inhalation alone may not be sufficient to prevent absorption of an excessive dose.

SAFETY PRECAUTIONS

Do not breath dust, mist, or HCN gas. Do not get in eyes. Avoid contact with skin and clothing. Do not carry foodstuffs, beverages, or tobacco where contamination with cyanide is possible. Wash thoroughly after handling. Wash contaminated clothing before reuse.

FIRST AID AND MEDICAL TREATMENT

Actions to be taken in case of cyanide exposure should be planned and practiced before beginning work with cyanides. In most cases, cyanide poisoning causes a deceptively healthy pink to red skin color; however, if a physical injury or lack of oxygen is involved, the skin color may be bluish.

Treatment for cyanide poisoning can be provided in two ways, "First Aid" and "Medical Treatment." Both require immediate action to prevent further harm or death. First aid using amyl nitrite and oxygen is generally given by a layman before medical help arrives.

Medical treatment involves intravenous injections and must be administered by qualified medical personnel. Even if a doctor or nurse is present, the need for fast treatment dictates using first aid treatment with amyl nitrite and oxygen while medical treatment materials for intravenous injection are being prepared. Experience shows that first aid given promptly is usually the only treatment needed.

Medical treatment is given if the victim does not respond to first aid. It provides a larger quantity of antidote including sodium thiosulfate to chemically destroy cyanide in the body. However, even under optimum conditions, amyl nitrite can be administered faster and should be used even if medical treatment follows. Do not overreact. Fast treatment is needed, but a conscious person usually does not need treatment beyond oxygen.

Amyl nitrite and medical treatment kits for cyanide poisoning are available, with doctor's prescription, from pharmacies.

A. First Aid—Directions for Giving Amyl Nitrite Antidote and Oxygen

1. Conscious: For inhalation and/or absorption if the victim is alert, oxygen may be all that is needed. But if he is not fully conscious or shows signs of poisoning, follow paragraph A-2 below. For swallowing, see paragraph C. "First Aid—Swallowing Cyanide."

2. Unconscious But Breathing: Break an amyl nitrite ampule in a cloth and hold lightly under the victim's nose for 15 seconds, then take away for 15 seconds. Repeat 5-6 times. If necessary, use a fresh ampule every 3 minutes until the victim regains consciousness (usually 1-4 ampules). Give oxygen to aid recovery. Where more severe poisoning has occurred, consider holding the amyl nitrite under the nose continuously for the first ampule or more.

3. Not Breathing:
   a. Give artificial respiration, preferably with an oxygen resuscitator. Give amyl nitrite antidote by placing a broken ampule inside the resuscitator face piece, being careful that the ampule does not enter the victim's mouth and cause choking.
   b. If using manual artificial respiration, give amyl nitrite antidote as in paragraph A-2 above except keep the first amyl nitrite ampule under the nose with replacement every 3 minutes.

4. Amyl Nitrite Notes:
   a. Amyl nitrite is highly volatile and flammable; do not smoke or use around source of ignition.
   b. If treating poison victim in a windy or drafty area, provide something—a rag, shirt, wall, drum, cupped hand, etc.—to prevent the amyl nitrite vapors from being blown away. Keep the ampule upwind from the nose. The objective is to get amyl nitrite into the victim's lungs.
   c. Rescuers should avoid amyl nitrite inhalation so they won't become dizzy and lose competence.
   d. Lay the victim down for treatment to maintain a good blood supply to the victim's head. Since amyl nitrite dilates the blood vessels and lowers blood pressure, lying down will help prevent unconsciousness.
   e. Do not overuse; excessive use might put the victim in shock. This has not occurred in practice at Du Pont plants and we are not aware of any death or serious aftereffects from treatment with amyl nitrite. (See paragraph E, "Medical Treatment.")

B. First Aid—Inhalation of Cyanide—Carry victim to fresh air. Lay victim down. Administer amyl nitrite antidote and oxygen (Paragraph A). Keep patient quiet and warm. Even with inhalation poisoning, thoroughly check clothing and skin to assure no cyanide is present. If cyanide is found on clothing or skin, proceed as in Paragraph D2. Call a physician.

C. First Aid—Swallowing Cyanide

1. Conscious: Immediately give patient one pint of 1% sodium thiosulfate solution (or plain water) by mouth and induce vomiting with finger in throat. Repeat until vomit fluid is clear. Never give anything by mouth to an unconscious person. Call a physician.

2. Unconscious: Follow first aid procedure as in paragraphs A-2 and A-3 (and/or medical treatment in paragraph E) and call a physician. If the victim revives, then proceed with paragraph C-1.

D. First Aid—Skin or Eye Contact (Skin Absorption)

1. Eye Contact: Immediately flush eyes with plenty of water, remove contaminated clothing, and keep victim quiet and warm. Call a physician.

2. Skin Contact: Wash skin to remove the cyanide while removing all contaminated clothing, including shoes. Do not delay. Skin absorption can occur from cyanide dust, solutions, or HCN vapor. Absorption is slower than inhalation, usually measured in minutes compared to seconds for inhalation.

Follow First Aid procedures in Paragraph A if treatment is needed, but even severe skin contact usually will not require treatment if 1) no inhalation or swallowing has occurred and 2) the cyanide is promptly washed from the skin and contaminated clothing and shoes are removed. If skin contact is prolonged, HCN poisoning may occur with nausea, unconsciousness, and then death possible if the source of cyanide intake is not removed and treatment provided. Even after washing the skin, the victim should be watched for at least 1 to 2 hours because absorbed cyanide can continue to work into the bloodstream. Wash clothing before reuse and destroy contaminated shoes.

E. Medical Treatment

Medical treatment is normally provided by a physician, but might be provided by a professionally trained "qualified medical person" where a need exists and where state and local laws permit.

While preparing for sodium nitrite and sodium thiosulfate injections, use amyl nitrite and oxygen as outlined in paragraph A. When ready and if the victim is not responding to first aid, first inject the solution of sodium nitrite (10 mL of a 3% solution) intravenously at the rate of 2.5 mL/minute, then immediately inject the sodium thiosulfate (50 mL of a 25% solution) at the same rate, taking care to avoid extravasation.

This is a fairly lengthy treatment (24 minutes) since a total of 10 + 50, or 60 mL is injected at a rate of 2.5 mL/minute. Consideration should be given to the size and condition of the victim as treatment is proceeding. The above sodium nitrite injection is about one-third of a lethal dose, so care should be taken to avoid excessive use. It is not essential that full quantities be given, just because treatment was started. Injections can be stopped at any point if recovery is evident.

Watch patient continuously for 24-48 hours if cyanide exposure was severe. If there is any return of symptoms during this period, repeat this treatment using one-half the amounts of sodium nitrite and sodium thiosulfate solutions. Caution should be used to avoid overuse of medical treatment chemicals as the prescribed dose is about 1/3 the lethal dose for an average individual.

If signs of excessive methemoglobinemia develop (i.e., blue skin and mucous membranes, vomiting, shock and coma), 1% methylene blue solution should be given intravenously. A total dose of 1 to 2 mg/kg of body weight should be administered over a period of five to ten minutes and should be repeated in one hour if necessary. In addition, oxygen inhalation will be helpful. Transfusion of whole fresh blood may be considered if there has been mechanical injury with external or internal bleeding and simultaneous cyanide exposure.

Du Pont's experience in treating cyanide poison cases is that first aid procedures using amyl nitrite and oxygen were effective and the only treatment needed in most cases. Medical treatment, using intravenous injections, was used in a few cases. Both procedures have been successful.

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PROTECTION INFORMATION

GENERALLY APPLICABLE CONTROL MEASURES

Good general ventilation should be provided to keep dust, mist, and HCN gas below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Recommended Minimum Protection—chemical splash goggles and rubber gloves (butyl or neoprene preferred).

Have available and use as appropriate: face shields; rubber suits, aprons, and boots; disposable toxic dust and mist respirators; self-contained breathing air supply (in case of emergency); HCN detector; first aid and medical treatment supplies,* including oxygen resuscitators.

*See Du Pont Sodium Cyanide Storage and Handling Bulletin for list of supplies.

DISPOSAL INFORMATION

AQUATIC TOXICITY

The compound is highly toxic (96-hour LC_{50} = 0.5 - 1 mg/L).

SPILL, LEAK OR RELEASE

Sweep up and shovel into a covered container or plastic bag, pending transfer, to secure the spill. Cover and keep spillage dry. Flush spill area with a dilute solution of sodium or calcium hypochlorite. Comply with Federal, State, and local regulations on reporting releases.

WASTE DISPOSAL

Comply with Federal, State, and local regulations. Do not flush cyanide into sewers which may contain an acid. Detoxify with sodium hypochlorite, or hydrogen peroxide; flush to waste water treatment system; or call a licensed disposal contractor.

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SHIPPING INFORMATION

DOT(172.101)	DOT/IMO (172.102)
PROPER SHIPPING NAME Sodium Cyanide, Solid	**PROPER SHIPPING NAME** Sodium Cyanide
HAZARD CLASS Poison B	**HAZARD CLASS** Poison B, 6.1
UN NO. 1689	**UN NO.** 1689

DOT LABEL(S)
Poison

REPORTABLE QUANTITY
10 lb/4.54 kg

SHIPPING CONTAINERS
CYANO-DOL(R) railcars and trucks; hopper railcars; Flo-Bins(R) (3000 lb. net); 2000 lb. bag in a box; 100 kilo, 100 lb., and 200 lb. steel drums

STORAGE CONDITIONS
Store in properly labeled containers in dry, ventilated, secured areas. Keep containers closed and contents dry. Do not store with acids or acid salts, containers with water or weak alkalis, or oxidizing agents. Do not handle or store food, beverages, or tobacco in cyanide areas. Do not store near combustibles or flammables because of cyanide solution runoff from water used for fire fighting.

ADDITIONAL INFORMATION AND REFERENCES

NPCA – HMIS RATINGS		NFPA RATINGS	
Health (Acute)	3	Health	3
Flammability	0	Flammability	0
Reactivity	1	Reactivity	0
Personal Protection	-	Unusual Hazards	-

Personal Protection rating to be supplied by user depending on use conditions.

For further information, see Du Pont Sodium Cyanide Storage and Handling Bulletin.

DATE OF LATEST REVISION/REVIEW: 12/87

PERSON RESPONSIBLE FOR MSDS:
J. C. Watts
Du Pont Co.
C&P Dept., Chestnut Run-709
Wilmington, DE 19898
(302) 999-4946

103800

DUPONT

UTC IH Lab

Form Approved
Budget Bureau No. 44-R1387
Approval Expires April 30, 1971

Form No. LSA-003-4
May 1969

PMC 1505

U.S. DEPARTMENT OF LABOR

WAGE AND LABOR STANDARDS ADMINISTRATION
Bureau of Labor Standards

Supplier
Phillip. Bros. Chemicals Inc.
Middletown, Conn 06457

RECEIVED
OCT 31 1980
G E PARSONS

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME: Copper Pigment & Chemical Inc.	EMERGENCY TELEPHONE NO.: (201) 6364300
ADDRESS (Number, Street, City, State, and ZIP Code): Arbor Street, Sewaren, N.J. 07077	
CHEMICAL NAME AND SYNONYMS: Sodium Cyanide	TRADE NAME AND SYNONYMS:
CHEMICAL FAMILY:	FORMULA: NaCN

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
In contact with acids it liberates poisonous & flamable		
hydrocyanic acid gas. Not to stored near nitrates-		
nitrite mixtures or peroxides.		

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	1500°g	SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____=1)	
SOLUBILITY IN WATER	Very soluble		
APPEARANCE AND ODOR	White powder or Crystals, when damp odor of HCN		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES: Sodium cyanide will not burn or support combustion. If exposed to water as thru perforations in steel containers of sodium cyanide will dissolve & small amounts of HCN gas may form by hydrolysis.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Do not use carbon dioxide type extinguishers.

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1746

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SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE 180-200 milligrams is considered the minimum lethal dose

EFFECTS OF OVEREXPOSURE Large doses patient becomes unconscious within a few seconds. Smaller doses dizziness, confusion, headache & vomiting.

EMERGENCY AND FIRST AID PROCEDURES Carry patient to fresh air have him lie down-remove contaninated clothing-keep patient warm. Start treatment immeadiately using Cyanide first aid kit. Call physician.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY (Materials to avoid) All acids.

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Sweep up solids and dispose in proper fashion.

WASTE DISPOSAL METHOD Cyanide waste is treated with sodium hypochlorite at a PH 8.5 to 10.0. Dispose in accordance with local, state and federa regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type) Dust respirators approved by Bureau of Mines for dus

VENTILATION	LOCAL EXHAUST	X	SPECIAL
	MECHANICAL (General)	X	OTHER

PROTECTIVE GLOVES Rubber

EYE PROTECTION Metal safety spectacles with side shields

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Do not store near acids, nitrate-nitrite mixtures. Store in dry area.

OTHER PRECAUTIONS Do not get in eyes, on skin or clothing.

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MATERIAL SAFETY DATA SHEET

IDENTIFICATION

NAME
Sodium Cyanide

GRADE
Cyanobrik*; Cyanogran*;
Compounders Grade

SYNONYMS
Cyanide of Sodium; Prussiate of Soda

CAS NAME Sodium Cyanide

I.D. NOS./CODES
NIOSH Registry No. VZ7525000

MANUFACTURER/DISTRIBUTOR
E. I. du Pont de Nemours & Co. (Inc.)

ADDRESS Wilmington, DE 19898

CHEMICAL FAMILY
Alkali Metal Cyanide

FORMULA NaCN

CAS REGISTRY NO. 143-33-9

PRODUCT INFORMATION PHONE
(800) 441-9442

MEDICAL EMERGENCY PHONE
(800) 441-3637

PHYSICAL DATA

BOILING POINT, 760 mmHg
1496°C (2725°F)

SPECIFIC GRAVITY 1.6

VAPOR DENSITY
Not volatile

pH INFORMATION 11.3 to 11.7
(Typical for 5 to 25% solutions with no pH adjustment)

FORM Solid

COLOR White

MELTING POINT
564°C (1047°F)

VAPOR PRESSURE Negligible

SOLUBILITY IN H_2O
37% at 20°C (68°F)

EVAPORATION RATE (BUTYL ACETATE=1)
Not applicable

APPEARANCE Granular or Briquettes

ODOR None (but can have slight ammonia and/or HCN odor if damp)

*Reg. U.S. Pat. & Tm Off., Du Pont Company. Cyanobrik® and Cyanogran® Sodium Cyanide are made only by Du Pont.

E-79954 Date: 10/85

HAZARDOUS COMPONENTS

MATERIAL(S)	APPROXIMATE %
Sodium Cyanide	100

HAZARDOUS REACTIVITY

INSTABILITY
Very stable when dry.

INCOMPATIBILITY
Large amounts of highly toxic, flammable hydrogen cyanide (HCN) gas will be evolved from contact with acids. Reacts violently with strong oxidizing agents. Water or weak alkaline solution can produce dangerous amounts of HCN in confined areas.

DECOMPOSITION
Moisture will cause slow decomposition, releasing poisonous HCN and ammonia gas.

POLYMERIZATION
Will not occur.

FIRE AND EXPLOSION DATA

FLASH POINT Will not burn.

FLAMMABLE LIMITS IN AIR, % BY VOL.
LOWER Not applicable.
UPPER Not applicable.

AUTOIGNITION TEMPERATURE
Not applicable.

FIRE AND EXPLOSION HAZARDS
Will not burn. Sodium cyanide will not be destroyed in an ordinary fire involving combustible materials such as paper or wood.

EXTINGUISHING MEDIA
Water on fires near sodium cyanide, but minimize amount of water if containers are opened or burned (see "Incompatibility", above) DO NOT use carbon dioxide (CO_2) which reacts with sodium cyanide to produce hydrogen cyanide if moisture is present.

SPECIAL FIRE FIGHTING INSTRUCTIONS
Sodium cyanide dissolves readily in water, therefore cyanide solution runoff may occur if containers are opened or burned. Runoff should be contained to avoid environmental or safety problems. Contained cyanide solution can be detoxified with hypochlorite.

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HEALTH HAZARD INFORMATION

PRINCIPAL HEALTH HAZARDS (Including Significant Routes, Effects, Symptoms of Over-Exposure, and Medical Conditions Aggravated by Exposure)

May be fatal if inhaled, swallowed, or absorbed through skin. Contact with acids or weak alkalis liberates poisonous gas. Causes eye burns and may irritate skin.

Oral LD50: 6 mg/kg in rats

Toxic effects described in animals from exposure include asphyxia, dyspnea, ataxia, tremors, coma, and lethality by disrupting oxidative metabolism. Tests in bacterial and mammalian cell cultures demonstrate no mutagenic activity. Tests in some animals indicate that the compound may affect the fetus, that is, it may be a developmental toxin.

Human health effects of overexposure may initially include: skin irritation with discomfort or rash, eye irritation or burns with discomfort, tearing, or blurring of vision, and possible permanent eye damage; and nonspecific discomfort such as nausea, headache, dizziness, vomiting, and weakness. Higher exposures may lead to these effects: rapid respiration; lowered blood pressure; unconsciousness; convulsions; and fatality. Evidence suggests that significant skin permeation can occur. Individuals with preexisting diseases of the central nervous system may have increased susceptibility to the toxicity of excessive exposures.

CARCINOGENICITY
Not listed as a carcinogen by IARC, NTP, OSHA, ACGIH, or Du Pont.

EXPOSURE LIMITS (PEL (OSHA), TLV (ACGIH), AEL (DU PONT), ETC.)
The OSHA 8-hour Time Weighted Average (TWA) and ACGIH TLV®-TWA are 5 mg/m^3, as CN. Both carry a "skin" notation indicating that cyanide may penetrate the skin (especially if the skin is broken). Control of vapor, dust, and mist inhalation alone may not be sufficient to prevent absorption of an excessive dose.

SAFETY PRECAUTIONS
Do not breathe dust, mist, or HCN gas. Do not get in eyes. Avoid contact with skin and clothing. Do not carry foodstuffs, beverages, or tobacco where contamination with cyanide is possible. Wash thoroughly after handling. Wash contaminated clothing before reuse.

FIRST AID AND MEDICAL TREATMENT
Actions to be taken in case of cyanide exposure should be planned and practiced before beginning work with cyanides. In most cases, cyanide poisoning causes a deceptively healthy pink to red skin color; however, if a physical injury or lack of oxygen is involved, the skin color may be bluish.

Treatment for cyanide poisoning can be provided in two ways, "First Aid" and "Medical Treatment". Both require immediate action to prevent further harm or death. First aid using amyl nitrite and oxygen is generally given by a layman before medical help arrives. Medical treatment involves

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intravenous injections and must be administered by qualified medical personnel. Even if a doctor or nurse is present, the need for fast treatment dictates using first aid treatment with amyl nitrite and oxygen while medical treatment materials for intravenous injection are being prepared. Experience shows that first aid given promptly is usually the only treatment needed.

Medical treatment is given if the victim does not respond to first aid. It provides a larger quantity of antidote including sodium thiosulfate to chemically destroy cyanide in the body. However, even under optimum conditions, amyl nitrite can be administered faster and should be used even if medical treatment follows. Do not overreact. Fast treatment is needed, but a conscious person usually does not need treatment beyond oxygen. Amyl nitrite and medical treatment kits for cyanide poisoning are available, with doctor's prescription, from pharmacies.

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A. First Aid - Directions for Giving Amyl Nitrite Antidote and Oxygen

1. Conscious:- For inhalation and/or absorption if the victim is alert, oxygen may be all that is needed. But if he is not fully conscious or shows signs of poisoning, follow paragraph A-2 below. For swallowing, see below paragraph C, "First Aid - Swallowing Cyanide".

2. Unconscious But Breathing: Break up amyl nitrite ampule in a cloth and hold lightly under the victim's nose for 15 seconds, then take away for 15 seconds. Repeat 5-6 times. If necessary, use a fresh ampule every 3 minutes until the victim regains consciousness (usually 1-4 ampules). Give oxygen to aid recovery. Where more severe poisoning has occurred, consider holding the amyl nitrite under the nose continuously for the first ampule or more.

3. Not Breathing:
   a. Give artificial respiration, preferably with an oxygen resuscitator. Give amyl nitrite antidote by placing a broken ampule inside the resuscitator face piece, being careful that the ampule does not enter the victim's mouth and cause choking.
   b. If using manual artificial respiration, give amyl nitrite antidote as in paragraph A-2 above except keep the first amyl nitrite ampule under the nose with replacement every 3 minutes.

4. Amyl Nitrite Notes:
   a. Amyl nitrite is highly volatile and flammable; do not smoke or use around source of ignition.
   b. If treating poison victim in a windy or drafty area, provide something - a rag, shirt, wall, drum, cupped hand, etc. - to prevent the amyl nitrite vapors from being blown away. Keep the ampule upwind from the nose. The objective is to get amyl nitrite into the victim's lungs.
   c. Rescuers should avoid amyl nitrite inhalation so they won't become dizzy and lose competence.
   d. Lay the victim down for treatment to maintain a good blood supply to the victim's head. Since amyl nitrite dilutes the blood vessels and lowers blood pressure, lying down will help prevent unconsciousness.

e. Do not overuse; excessive use might put the victim in shock. This has not occurred in practice at Du Pont plants and we are not aware of any death or serious after effects from treatment with amyl nitrite. (See paragraph E, "Medical Treatment".)

B. First Aid - Inhalation of Cyanide - Carry the victim to fresh air. Lay victim down. Administer amyl nitrite antidote and oxygen (Paragraph A). Check for and remove contaminated clothing. Keep patient quiet and warm. Call a physician.

C. First Aid - Swallowing Cyanide

1. Conscious: Immediately give patient one pint of 1% sodium thiosulfate solution (or plain water) by mouth and induce vomiting with finger in throat. Repeat until vomit fluid is clear. Never give anything by mouth to an unconscious person. Call a physician.

2. Unconscious: Follow first aid procedure as in paragraphs A-2 and A-3 (and/or medical treatment in paragraph E) and call a physician. If the victim revives, then proceed with paragraph C-1.

D. First Aid - Skin or Eye Contact (Skin Absorption)

1. Eye Contact: Immediately flush eyes with plenty of water, remove contaminated clothing, and keep victim quiet and warm. Call a physician.

2. Skin Contact: Wash skin to remove the cyanide while removing all contaminated clothing, including shoes. Do not delay. Skin absorption can occur from cyanide dust, solutions, or HCN vapor. Absorption is slower than inhalation, usually measured in minutes compared to seconds for inhalation.

Follow First Aid procedures in Paragraph A if treatment is needed, but even severe skin contact usually will not require treatment if 1) no inhalation or swallowing has occurred and 2) the cyanide is promptly washed from the skin and contaminated clothing and shoes are removed. If skin contact is prolonged, HCN poisoning may occur with nausea, unconsciousness, and then death possible if the source of cyanide intake is not removed and treatment provided. Even after washing the skin, the victim should be watched for at least 1 to 2 hours because absorbed cyanide can continue to work into the bloodstream. Wash clothing before reuse and destroy contaminated shoes.

E. Medical Treatment

Medical treatment is normally provided by a physician, but might be provided by a professionally trained "qualified medical person" where a need exists and where state and local laws permit.

While preparing for sodium nitrite and sodium thiosulfate injections, use amyl nitrite and oxygen as outlined in paragraph A. When ready and if the victim is not responding to first aid, first inject the solution

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of sodium nitrite (10 mL of a 3% solution) intravenously at the rate of 2.5 mL/minute, then immediately inject the sodium thiosulfate (50 mL of a 25% solution) at the same rate, taking care to avoid extravasation.

This is a fairly lengthy treatment (24 minutes) since a total of 10 + 50, or 60 mL is injected at a rate of 2.5 mL/minute. Consideration should be given to the size and condition of the victim as treatment is proceeding. The above sodium nitrite injection is about one third of a lethal dose, so care should be taken to avoid excessive use. It is not essential that full quantities be given, just because treatment was started. Injections can be stopped at any point if recovery is evident.

Watch patient continuously for 24-48 hours if cyanide exposure was severe. If there is any return of symptoms during this period, repeat this treatment using one-half the amounts of sodium nitrite and sodium thiosulfate solutions. Caution should be used to avoid overuse of medical treatment chemicals as the prescribed dose is about 1/3 the lethal dose for an average individual.

If signs of excessive methemoglobinemia develop (i.e., blue skin and mucous membranes, vomiting, shock and coma), 1% methylene blue solution should be given intravenously. A total dose of 1 to 2 mg/kg of body weight should be administered over a period of five to ten minutes and should be repeated in one hour if necessary. In addition, oxygen inhalation will be helpful. Transfusion of whole fresh blood may be considered if there has been mechanical injury with external or internal bleeding and simultaneous cyanide exposure.

Du Pont's experience in treating cyanide poison cases is that first aid procedures using amyl nitrite and oxygen were effective and the only treatment needed in most cases. Medical treatment, using intravenous injections, was used in a few cases. Both procedures have been successful.

PROTECTION INFORMATION

GENERALLY APPLICABLE CONTROL MEASURES

Good general ventilation should be provided to keep dust, mist, and HCN gas below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Recommended Minimum Protection - chemical splash goggles and rubber gloves (butyl or neoprene preferred).

Have available and use as appropriate: face shields; rubber suits, aprons, and boots; disposable toxic dust and mist respirators; self-contained breathing air supply (in case of emergency); HCN detector; first aid and medical treatment supplies*, including oxygen resuscitators.

*See Du Pont Sodium Cyanide Storage and Handling Bulletin for list of supplies.

DISPOSAL INFORMATION

AQUATIC TOXICITY
The compound is highly toxic (96-hour LC50 = 0.5 - 1 mg/L).

SPILL, LEAK OR RELEASE
Sweep up and shovel into a covered container or plastic bag, pending transfer, to secure the spill. Cover and keep spillage dry. Flush spill area with a dilute solution of sodium or calcium hypochlorite. Comply with Federal, State, and local regulations on reporting releases.

WASTE DISPOSAL
Comply with Federal, State, and local regulations. Do not flush cyanide into sewers which may contain an acid. Detoxify with sodium hypochlorite, or hydrogen peroxide; flush to waste water treatment system; or call a licensed disposal contractor.

SHIPPING INFORMATION

DOT (172.101)

PROPER SHIPPING NAME
Sodium Cyanide, Solid

HAZARD CLASS
Poison B

UN NO. 1689

DOT LABEL(S) Poison

DOT/IMO (172.102)

PROPER SHIPPING NAME
Sodium Cyanide

HAZARD CLASS
Poison B, 6.1

UN NO. 1689

IMO (PAGE 6167)

PROPER SHIPPING NAME
Sodium Cyanide

HAZARD CLASS 6.1

UN NO. 1689

IMO LABEL(S) Poison

IATA/ICAO

PROPER SHIPPING NAME
Sodium Cyanide

HAZARD CLASS 6.1

UN NO. 1689

LABEL(S) Poison

PACKAGING GROUP NO. I

PMC 1505

OTHER INFORMATION

REPORTABLE QUANTITY 10 lb/4.54 kg

SHIPPING CONTAINERS
"Wet Flo" railcars and trucks; hopper railcars; Flo-Bins® (3000 lb. net); 2000 lb. bag in a box; 100 kilo, 100 lb., and 200 lb. steel drums

STORAGE CONDITIONS
Store in properly labeled containers in dry, ventilated, secured areas. Keep containers closed and contents dry. Do not store with acids or acid salts, containers with water or weak alkalis, or oxidizing agents. Do not handle or store food, beverages, or tobacco in cyanide areas. Do not store near combustibles or flammables because of cyanide solution runoff from water used for fire fighting.

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ADDITIONAL INFORMATION AND REFERENCES

For further information, see Du Pont Sodium Cyanide Storage and Handling Bulletin.

DATE OF LATEST REVISION/REVIEW: 8/85
PERSON RESPONSIBLE FOR MSDS: J. C. Watts, Du Pont Co., C&P Dept., Chestnut Run, Wilmington, DE 19898, (302) 999-4946

DUPONT

PMC 1506

OMI INTERNATIONAL CORPORATION
21441 Hoover Road, Warren, MI 48089

24-Hour EMERGENCY Phone Number
313-497-9129

REVISION: 5/29/86

MATERIAL SAFETY DATA SHEET

RECEIVED
JUN 10 1988
INDUSTRIAL HYGIENE

May be used to comply with OSHA's Hazard Communication Standard, 29CFR 1910. 1200. Standard must be consulted for specific requirements.

Section I

Product Trade Name: UDYLITE: BRY-CAD® 153 Salts
Proprietary Formulation

Section II

Hazardous Components	CAS No.	Percentage	TLV OSHA ACGIH	Listed: NTP/IARC/OSHA Z/EPA (C=Carcinogen mutagen/toxic teratogen embryotoxic fetotoxic)
Sodium Cyanide	143-33-9	80	5 mg/M³ skin	N/A
Cadmium Oxide as Cd	1306-19-0	15 to 20	0.05 mg/M³	IARC C / NTP C
Sodium Hydroxide	1310-73-2	<2.0	2 mg/M³	OSHA Z H

Physical Data — Section III

Appearance and Odor: Tan, odorless solids

Solubility in Water:		Boiling Point	N/A
Negligible	<0.1%	Vapor Pressure	N/A
Slight	0.1-1.0%	Percent Volatile by Volume	N/A
Moderate	1.0-10.0% X	Evaporation Rate	N/A
Appreciable	>10.0%	Specific Gravity	N/A
Complete(all proportions)		pH	N/A

Fire and Explosion Hazard Data — Section IV

Flash Point (method used): None
Flammable/Explosive Limits LEL N/A UEL N/A
NFPA Code (0-4): Health 4 Flammability 0 Reactivity 0

Extinguishing Media: Product does not burn. Use media suitable for surrounding fire.
Special Fire-Fighting Procedures: Wear self-contained breathing apparatus and full protective clothing.
Unusual Fire and Explosion Hazards: Contact with acids will liberate toxic and flammable hydrogen cyanide gas.

Health Hazard Data — Section V

Threshold Limit Value: None known or established.
Effects of Overexposure:
Acute: May be fatal through cyanide poisoning via cyanide ingestion or inhalation of hydrogen cyanide gas.
Chronic: Potential irritant to skin and eyes.
Principal Route of Exposure: Inhalation, skin absorption, ingestion.

Emergency First Aid Procedures:
Eye: Wash with a directed stream of water for 15 minutes. Get medical attention.
Skin: Immediately wash with soap and water. Remove contaminated clothing.
Inhalation: Remove to fresh air. Give artificial respiration if not breathing. If breathing is difficult, give oxygen. Seek medical attention.
Swallowing: Break an amyl nitrite pearl in a clean cloth and hold under nose for 15 seconds. If victim is conscious, induce vomiting by administering syrup of ipecac. Get medical attention immediately.

PMC 1506

OMI International Corporation Material Safety Data Sheet

Product Trade Name BRY-CAD® 153 Salts

Reactivity Data — Section VI

Stability: Stable X Unstable ____

Incompatibility (Materials to Avoid): Acids

Hazardous Decomposition Products: Hydrogen cyanide gas.

Hazardous Polymerization May Occur ____ Will Not Occur X

Spill or Leak Procedures — Section VII

Steps to be taken in case material is released or spilled:
Work upwind. Sweep up and place into a lined container properly labeled for disposal.

Waste Disposal Method: Licensed waste treatment facility.

EPA I.D. Number: D003 RQ: (100/45.4)

Special Protection Information — Section VIII

Ventilation:
Local Exhaust: Yes
Respiratory Protection: NIOSH dust mask

Protective Clothing:
Gloves: butyl rubber or neoprene
Boots: Yes
Chemical Safety Goggles: Yes
Other: full protective clothing
Full Face Shield: No

Note: Eye Fountain and Safety Shower must always be available.

Special Precautions — Section IX

Handling & Storage: Store away from acids and foods.

Other: None

Shipping Information — Section X

DOT Proper Shipping Name: Cyanide Mixture, Dry UN 1588

Hazard Class: Poison B

DOT Label(s): Poison 6

IATA Class: 6.1 Packing Group: II

IMDGC Class: 6.1 Packing Group: II

Prepared by: Carl N. Gilsdorf, Manager, Quality Assurance Date 5/29/86

This form has been prepared and reviewed by technically knowledgeable people and is based on information OMI International Corporation believes to be reliable. This information is provided solely to provide health and safety guidelines and is not to be intended for any other purpose.

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UTC IHL

MAY 18 '82 1746

PMC 1506

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

RECEIVED BY
MAR 11 1980
G. E. PARSONS

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Oxy Metal Industries Corporation	(313) 497-9100

ADDRESS (Number, Street, City, State, and ZIP Code): 21441 Hoover Road Warren, Michigan 48089

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Bry-Cad #153	Cadmium Make-Up Salts
CHEMICAL FAMILY: See Below	FORMULA: See Below

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS	X	X	BASE METAL	X	X
CATALYST	X	X	ALLOYS	X	X
VEHICLE	X	X	METALLIC COATINGS	X	X
SOLVENTS	X	X	FILLER METAL PLUS COATING OR CORE FLUX	X	X
ADDITIVES	X	X	OTHERS	X	X
OTHERS	X	X		X	X

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
A mixture of inorganic compounds containing Sodium Cyanide as,	80.5	5 mg/M^3
Cadmium Oxide as,	17.1	X
and Caustic Soda as,	2.4	2 mg/M^3
	-	-

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	NA	SPECIFIC GRAVITY (H_2O=1)	1.0
VAPOR PRESSURE (mm Hg.)	NA	PERCENT, VOLATILE BY VOLUME (%)	None
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____ =1)	None
SOLUBILITY IN WATER	Moderate		X

APPEARANCE AND ODOR: Tan odorless solids.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None	None	X	X

EXTINGUISHING MEDIA
Product does not burn or support combustion,

SPECIAL FIRE FIGHTING PROCEDURES
Wear complete protective clothing: also a self-contained breathing apparatus.
Use water and water spray if involved in a fire. Work up wind of fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS
HCN gas (hydrogen cyanide) is liberated in a fire. HCN gas is flammable and poisonous.

(Continued on reverse side)

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SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
As Cyanide (CN) in 5 mg/M^3

EFFECTS OF OVEREXPOSURE
Highly toxic. Weakness. Dizziness. Confusion. Vomiting. Unconsciousness. Consult (1)

EMERGENCY AND FIRST AID PROCEDURES
Give prompt treatment. Maintain respiration. Administer Amyl Nitrite. Flush eyes and skin with water. For eyes get medical attention. Wash other affected areas of the body with soap and water. Consult (1)

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*
Acids and Feed or Food products.

HAZARDOUS DECOMPOSITION PRODUCTS
HCN gas

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Carefully sweep up and return to container. Work up wind of spill and avoid dusting conditions. Do not breathe solids. Consult (1)

WASTE DISPOSAL METHOD
Transfer to cyanide treatment system and handle in the approved manner. Or, refer product to a licensed industrial waste hauler.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
U.S. Bureau of Mines Dust Respirator for exposure above TLV limit. Consult (1)

VENTILATION	LOCAL EXHAUST: Yes	SPECIAL: No
	MECHANICAL *(General)*: No	OTHER: No

PROTECTIVE GLOVES: rubber gloves	EYE PROTECTION: chemical safety goggles

OTHER PROTECTIVE EQUIPMENT
Rubber apron and rubber topped safety-toe shoes or boots.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Store in a dry area away from all other chemicals. Protect from physical damage. Do not handle with bare hands. Clean contaminated clothing promptly.

OTHER PRECAUTIONS
Wash with soap and water after using. No eating, drinking or smoking in work area.

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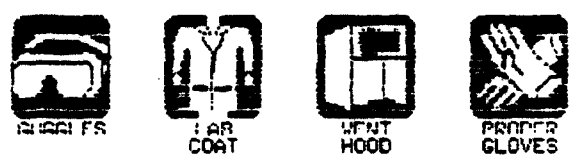
SECTION I - PRODUCT IDENTIFICATION

Product Name: Cadmium Oxide
Formula: CdO
Formula Wt: 128.40
CAS No.: 1306-19-0
NIOSH/RTECS No.: EV1925000
Common Synonyms: Cadmium fume
Product Codes: 1234

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA* System

Laboratory Protective Equipment



Precautionary Label Statements

POISON! DANGER!
MAY BE FATAL IF SWALLOWED OR INHALED
EXCEPTIONAL HEALTH HAZARD - READ MATERIAL SAFETY DATA SHEET
NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE.
Do not get in eyes, on skin, on clothing.
Do not breathe dust. Keep in tightly closed container. Use with adequate ventilation. Wash thoroughly after handling.

SAF-T-DATA* Storage Color Code: Blue (health)

SECTION II - HAZARDOUS COMPONENTS

Component	%	CAS No.
Cadmium Oxide	99-100	1306-19-0

SECTION III - PHYSICAL DATA

Boiling Point: N/A Vapor Pressure(mmHg): N/A

Continued on Page: 2

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SECTION III - PHYSICAL DATA (Continued)

Melting Point: 900°C (1652°F) DECOMPOSES Vapor Density(air=1): N/A

Specific Gravity: 8.15 (H_2O=1) Evaporation Rate: N/A (Butyl Acetate=1)

Solubility(H_2O): Negligible (less than 0.1 %) % Volatiles by Volume: 0

Appearance & Odor: Dark brown powder or crystals. Odorless.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: N/A

Flammable Limits: Upper - N/A % Lower - N/A %

Fire Extinguishing Media

Use extinguishing media appropriate for surrounding fire.

ecial Fire-Fighting Procedures

Firefighters should wear proper protective equipment and self-contained breathing apparatus with full facepiece operated in positive pressure mode. Move containers from fire area if it can be done without risk. Use water to keep fire-exposed containers cool.

Unusual Fire & Explosion Hazards

NOTE: Decomposes at melting point.

Toxic Gases Produced

cadmium fumes

SECTION V - HEALTH HAZARD DATA

This substance is listed as a NTP anticipated human carcinogen and an IARC probable human carcinogen (Groups 2A and 2B). TLV(Ceiling) and PEL (Ceiling) are listed for Cadmium Oxide & Fume, as Cd. There is no STEL value established for this product.

Threshold Limit Value (TLV/TWA): 0.05 mg/m^3 (ppm)

Permissible Exposure Limit (PEL): 0.1 mg/m^3 (ppm)

Toxicity: LD_{50} (oral-rat)(mg/kg) - 72

LD_{50} (ipr-rat)(mg/kg) - 12

Continued on Page: 3

SECTION V - HEALTH HAZARD DATA (Continued)

Carcinogenicity: NTP: Yes IARC: Yes Z List: No OSHA req: No

Effects of Overexposure

Inhalation and ingestion are harmful and may be fatal.
Inhalation of dust may cause headache, coughing, difficulty in breathing, chest pain, severe lung irritation, or pulmonary edema.
Contact with skin or eyes may cause irritation.
Ingestion may cause nausea and vomiting.
Ingestion may cause gastrointestinal irritation.
Chronic effects of overexposure to cadmium compounds may include irreversible lung damage, kidney disease, and other adverse effects.

Target Organs

respiratory system, lungs, kidneys, blood

Medical Conditions Generally Aggravated By Exposure

None Identified

Routes Of Entry

inhalation, ingestion, skin contact, eye contact

Emergency and First Aid Procedures

CALL A PHYSICIAN.
If swallowed, if conscious, immediately induce vomiting.
If inhaled remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Wash clothing before re-use.

For products sold in the state of California, the state requires that we provide to users and their employees the following message:

WARNING: THIS PRODUCT IS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

SECTION VI - REACTIVITY DATA

Stability: Stable Hazardous Polymerization: Will not occur

Conditions to Avoid: heat

Incompatibles: magnesium

Decomposition Products: cadmium fumes

Continued on Page: 4

SECTION VII - SPILL AND DISPOSAL PROCEDURES

Steps to be taken in the event of a spill or discharge

Wear self-contained breathing apparatus and full protective clothing. With clean shovel, carefully place material into clean, dry container and cover; remove from area. Flush spill area with water.

Disposal Procedure

Dispose in accordance with all applicable federal, state, and local environmental regulations.

EPA Hazardous Waste Number: D006 (EP Toxic Waste)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

Ventilation:	Use general or local exhaust ventilation to meet TLV requirements.
Respiratory Protection:	Respiratory protection required if airborne concentration exceeds TLV. At concentrations up to 1 ppm, a high-efficiency particulate respirator is recommended. Above this level, a self-contained breathing apparatus is advised.
Eye/Skin Protection:	Safety goggles, uniform, apron, rubber gloves are recommended.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA* Storage Color Code: Blue (health)

Special Precautions

Keep container tightly closed. Store in secure poison area. Isolate from incompatible materials.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

Proper Shipping Name: Chemicals, n.o.s. (Non-regulated)

INTERNATIONAL (I.M.O.)

Proper Shipping Name	Poisonous solids, n.o.s. (Cadmium Oxide)
Hazard Class	6.1
UN/NA	UN2811
Labels	HARMFUL - STOW AWAY FROM FOOD STUFFS

Continued on Page: 5

N/A = Not Applicable or Not Available

The information published in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the user's responsibility to determine the suitability of this information for the adoption of necessary safety precautions. We reserve the right to revise Material Safety Data Sheets periodically as new information becomes available. J. T. Baker Inc. makes no warranty or representation about the accuracy or completeness nor fitness for purpose of the information contained herein.

PMC 150/

UTC IHL

PMC 1507

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

COPY TO LOCAL I.A.M. 1746 MAY 18 '82

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Oxy Metal Industries Corporation	(313) 497-9100

ADDRESS (Number, Street, City, State, and ZIP Code): 21441 Hoover Road Warren, Michigan 48089

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Cadmium Oxide	Cadmium Salt #2
CHEMICAL FAMILY	**FORMULA**
Metal Oxide	CdO

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS	No	No	BASE METAL	No	No
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Does not pertain to.	No	No

SECTION III - PHYSICAL DATA

BOILING POINT (°F.) decomposes at	900°C	SPECIFIC GRAVITY (H_2O=1)	6.95
VAPOR PRESSURE (mm Hg.) 1 mm at	1000°C	PERCENT, VOLATILE BY VOLUME (%)	None
VAPOR DENSITY (AIR=1)	None	EVAPORATION RATE (_____ =1)	None
SOLUBILITY IN WATER	Insoluble		X

APPEARANCE AND ODOR: Brown amorphous powder, odorless.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None	None	X	X

EXTINGUISHING MEDIA: Does not pertain to.

SPECIAL FIRE FIGHTING PROCEDURES: Does not pertain to.

UNUSUAL FIRE AND EXPLOSION HAZARDS: As a fine dust Cadmium Oxide may initiate or contribute ~~to a~~ fire in the presence of a spark and open flame.

(Continued on reverse side)

COPY TO LOCAL I.A.M.

Cadmium Salt #2 MAY 18 '82 1746 PMC 1507

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
None known for product. As Cadmium Fume 0.1 mg/M^3.

EFFECTS OF OVEREXPOSURE
Systemic poison by way of inhalation and ingestion.

EMERGENCY AND FIRST AID PROCEDURES
Flush skin and eyes with water. For eyes get medical attention.

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*
Feed or food products. Acids. Organics. Oxidants.

HAZARDOUS DECOMPOSITION PRODUCTS
Not known.

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Cautiously sweep up and return to original container.

WASTE DISPOSAL METHOD
Refer to a licensed industrial waste contractor.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
Chemical cartridge respirator for exposure above T.L.V. Limit.

VENTILATION				
	LOCAL EXHAUST	Yes	SPECIAL	No
	MECHANICAL *(General)*	No	OTHER	No

PROTECTIVE GLOVES	EYE PROTECTION
rubber gloves	chemical safety goggles

OTHER PROTECTIVE EQUIPMENT
No

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Avoid excessive skin contact. Do not breathe solids. Do not get in eyes, on skin, on clothing.

OTHER PRECAUTIONS
For Industrial Use Only. Do Not Take Internally.

JUL 2 0 1977

THE INDIUM CORPORATION OF AMERICA
1676 Lincoln Ave. • Utica, NY 13502
Emergency Telephone No. 315-797-1630 INDUSTRIAL HYGIENE

RECEIVED
OCT 15 1987

Material Safety Data Sheet

Common Name Potassium Cyanide

Quick Identifier KCN

PMC1508

SECTION 1—HAZARDOUS INGREDIENTS/IDENTITY

Hazardous Component(s) (chemical and common name(s))	OSHA PEL	ACGIH TLV	% (optional)	CAS NO.
Potassium Cyanide	5 mg/m3	5 mg/m3	100	151-50-8

Safety Precautions: Do not breathe dust, mist or HCN gas. Do not get in eyes. Avoid contact with skin and clothing. Do not carry foodstuffs, beverages, or tobacco where contamination with cyanide is possible. Wash thoroughly after handling. Wash contaminated clothing before reuse.

SECTION 2—PHYSICAL AND CHEMICAL CHARACTERISTICS

Boiling Point: Not available

Specific Gravity (H_2O = 1): 1.52

Vapor Density (Air = 1): Not volatile

Vapor Pressure (mm Hg): Negligible

Solubility in Water: 41.7% @ 25°C

Reactivity in Water: NA

Appearance and Odor: Solid, white/none: ammoniacol if damp.

Melting Point: 634.5°C (1174°F)

SECTION 3—FIRE AND EXPLOSION DATA

Flash Point: NA F. C. Method Used: NA

Flammable Limits in Air % by Volume: LEL Lower NA UEL Upper NA

Auto-Ignition Temperature: NA

Extinguisher Media: ☐ Foam ☐ "Alcohol" Foam ☐ CO_2 ☐ Dry Chemical ☒ Water Spray ☐ Other ☐ N.A.

Special Fire Fighting Procedures: Potassium Cyanide dissolve readily in water, therefore cyanide solution runoff may occur if containers are opened. Runoff should be contained to avoid environmental or safety problems. Contained cyanide solution can be detoxified with hypochlorite.

Unusual Fire and Explosion Hazards: Will not burn. Potassium Cyanide will not be destroyed in an ordinary fire involving combustible materials such as paper or wood.

Do not use carbon dioxide (CO2) which reacts with potassium cyanide to produce hydrogen cyanide if moisture is present. (See "incompatibility" below).

SECTION 4—PHYSICAL HAZARDS (REACTIVITY DATA)

Stability: Unstable ☐ Stable ☒ Conditions to Avoid: NA

Incompatibility (Materials to Avoid): Lg. amts. of highly toxic, flammable HCN gas willbe evolved from contact with acids. Reacts violently with strong oxidiyers. Water or weak alkaline solution

Hazards Decomposition Products: can produce dangerous amts. of HCN. Moisture will cause slow decomp,

Hazardous Polymerization: May Occur ☐ Will Not Occur ☒ Conditions to Avoid: NA releasing poisonous HCN and ammonia gas.

May be used to comply with OSHA's Hazard Communication Standard, 29CFR 1910. 1200. Standard must be consulted for specific requirements.

Date Prepared: 4/87

DAP

PMC 1508

SECTION 5—HEALTH HAZARDS

1. Acute	Inhalation	Rapid respiration; asphyxia and death can occur
	Eyes	Burning and irritation; tearing blurring of vision
	Skin	Irritation, Rash
	Ingestion	No data
2. Chronic	Inhalation	Rapid respiration
	Eyes	Burning and irritation; tearing, blurring of vision; permanent eye dar
	Skin	Irritation, Rash, Significant skin permeation can occur.
	Ingestion	No data

Signs and Symptoms of Exposure: Nausea; headache, dizziness, vomiting, weakness, rapid respiration, lowered blood pressure, unconsciousness, convulsions and fatality.

Medical Conditions Generally Aggravated by Exposure: Individuals with preexisting diseases of the central nervous system may have increased susceptibility to the toxicity of excessive exposures.

Chemical Listed as Carcinogen or Potential Carcinogen — National Toxicology Program: Yes ☐ No ☒ — I.A.R.C. Monographs: Yes ☐ No ☒ — OSHA: Yes ☐ No ☒

Emergency and First-Aid Procedures: See Attached.

* Target Organs: CVS.CNS, liver, kidneys, skin

SECTION 6—SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage: Containers of this material may be hazardous when emptied, since emptied containers retain product residues. Store away from incompatible materials.

Steps to be Taken in Case Material is Released or Spilled: Sweep up and shovel into a covered container. Cover and keep spillage dry. Flush spill area with a dilute solution of sodium or calcium hypochlorite. Comply with Federal, State and local regulations on reporting releases

Waste Disposal Methods (Consult federal, state, and local regulations): Comply with Federal, State, and Local regulations.

SECTION 7—SPECIAL PROTECTION INFORMATION/CONTROL MEASURES

Respiratory Protection (Specify Type): NIOSH/MSHA approved respirators

Ventilation	Local Exhaust	Recommended
	Mechanical (General)	Required

Protective Gloves: Recommended (rubber) — Eye Protection: Chemical splash gaggles

Other Protective Clothing or Equipment: Coveralls

Work/Hygienic Practices: Normal safety and work practices that are consistent with good personal hygiene.

SECTION 8—REFERENCES

Dangerous Properties of Industrial Materials; N. Irving Sax 1984

DuPont; Wilmington, DE.

NIOSH Pocket Guide To Chemical Hazards 1985

Potassium Cyanide MSDS cont'd.

First Aid And Medical Treatment

Actions to be taken in case of cyanide exposure should be planned and practiced before beginning work with cyanides. In most cases, cyanide poisoning causes a deceptively healthy pink to red skin color; however, if a physical injury or lack of oxygen is involved, the skin color may be bluish.

Treatment for cyanide poisoning can be provided in two ways, "First Aid" and Medical Treatment." Both require immediate action to prevent further harm or death. First Aid using amyl nitrite and oxygen is generally given by a layman before medical help arrives. Medical treatment involves intravenous injections and must be administered by qualified medical personnel. Even if a doctor or nurse is present, the need for fast treatment dictates using first aid treatment with amyl nitrite and oxygen while medical treatment materials for intravenous injection are being prepared. Experience shows that first aid given promptly is usually the only treatment needed.

Medical treatment is given if the victim does not respond to first aid. It provides a larger quantity of antidote including sodium thiosulfate to chemically destroy cyanide in the body. However, even under optimum conditions, amyl nitrite can be administered faster and should be used even if medical treatment follows. Do not overreact. Fast treatment is needed, but a conscious person usually does not need treatment beyond oxygen. Amyl niture and medical treatment kits for cyanide poisoning are available, with doctor's prescription from pharmacies.

Potassium Cyanide MSDS cont'd.

A. First Aid - Directions for giving amyl nitrite antidote and oxygen.

1. Conscious: For inhalation and/or absorption if the victim is alert, oxygen may be all that is needed. But if he is not fully conscious or shows signs of poisoning , follow paragraph #2 below. For swallowing, see paragraph C below.

2. Unconscious But Breathing: Break up amyl nitrite ampule in a cloth and hold lightly under the victim's nose for 15 seconds, then take away for 15 seconds. Repeat 5-6 times. If necessary, use a fresh ampule every 3 minutes until the victim regains consciousness (usually 1-4 ampules). Give oxygen to aid recovery. Where more severe poisoning has occurred, consider holding the amyl nitrite under the nose continuously for the first ampule or more.

3. Not Breathing: Give artificial respiration, preferably with an oxygen resuscitator. Give amyl nitrite antidote by placing a broken ampule inside the resuscitator face piece, being careful that the ampule does not enter the victims mouth and cause choking.

   If using manual artificial respiration, give amyl nitrite antidote as in paragraph A-2 above except keep the first amyl nitrite ampule under the nose with replacement every 3 minutes.

4. Amyl Nitrite Notes:

   a. Amyl nitrite is highly volatile and flammable; do not smoke or use around source of ignition.

   b. If treating poison victim in a windy or drafty area provide something - A rag, shirt, wall, drum, cupped hand, etc. - to prevent the amyl nitrite vapors from being blown away.

   c. Rescuer should avoid amyl nitrite inhalation so they won't become dizzy and lose competence.

   d. Lay the victim down for treatment to maintain a good blood supply to the victims head. Since amyl nitrite dilutes the blood vessels and lowers blood pressure, lying down will help prevent unconsciousness.

   e. Do not over use, excessive use may put victim in shock.

Potassium Cyanide MSDS cont'd.

B. First Aid - Inhalation of Cyanide - Carry the victim to fresh air. Lay victim down. Administer amyl nitrite antidote and oxygen (Paragraph A.) Check for and remove contaminated clothing. Keep patient quiet and warm. Call a physician.

C. First Aid - Swallowing Cyanide

1. Conscious: Immediately give patient one pint of 1% sodium thiosulfate solution (or plain water) by mouth and induce vomiting with finger in throat. Repeat until vomit fluid is clear. Never give anything by mouth to an unconscious person. Call a physician.

2. Unconscious: Follow first aid procedure as in paragraphs A-2 and A-3 (and/or medical treatment in Paragraph E) and call a physician. If the victim revives, then proceed with paragraph C-1.

D. First Aid - Skin or Eye Contact (Skin Absorption)

1. Eye Contact: Immediately flush eyes with plenty of water, remove contaminated clothing, and keep victim quiet and warm. Call a physician.

2. Skin Contact: Wash skin to remove the cyanide while removing all contaminated clothing, including shoes. Do not delay. Skin absorption can occur from cyanide dust, solutions, or HCN vapor, absorption is slower than inhalation, usually measured in minutes compared to seconds for inhalation.

Follow first aid procedures in Paragraph A if treatment is needed, but even severe skin contact usually will not require treatment if 1) no inhalation or swallowing has occurred and 2) the cyanide is promptly washed from the skin and contaminated clothing and shoes are removed. If skin contact is prolonged, HCN poisoning may occur with nausea, unconsciousness, and then death possible if the source of cyanide intake is not remvoed and treatment provided. Even after washing the skin, the victim should be watched for at least 1 to 2 hours becauseabsorbed cyanide can continue to work into the bloodstream. Wash clothing before reuse and destroy contaminated shoes.

E. Medical Treatment

Medical treatment is normally provided by a physician, but might be provided by a professionally trained "qualified medical person" where needs exist and where state and local laws permit.

Potassium Cyanide MSDS cont'd.

While preparing for sodium nitrite and sodium thiosulfate injections, use amyl nitrite and oxygen as outlined in paragraph A. When ready and if the victim is not responding to first aid, first inject the solution of sodium nitrite (10 mL of a 3% solution) intravenously at the rate of 2.5 mL/minute, then immediately inject the sodium thiosulfate (50 mL of a 25% solution) at the same rate, taking care to avoid extravasation.

This is a fairly lengthy treatment (24 minutes) since a total of 10+ 50, or 60 mL is injected at a rate of 2.5 mL/minute. Consideration should be given to the size and condition of the victim as treatment is proceeding. The above sodium nitrite injection is about one third of a lethal dose, so care should be taken to avoid excessive use. It is not essential that full quantities be given, just because treatment was started. Injections can be stopped at any point if recovery is evident.

Watch patient continuously for 24-48 hrs if cyanide exposure was severe. If there is any return of symptoms during this period, repeat this treatment using one-half the amounts of sodium nitrite and sodium thiosulfate solutions. Caution should be used to avoid overuse of medical treatment chemicals as the prescribed dose is about 1/3 the lethal dose for an average individual.

If signs of excessive methemoglobinemia develop (i.e., blue skin and mucous membranes, vomiting, shock and coma), 1% methylene blue solution should be given intravenously. A total dose of 1 to 2 mg/kg of body weight should be administered over a period of five to ten minutes and should be repeated one hour if necessary. In addition, oxygen inhalation will be helpful. Transfusion of whole fresh blood may be considered if there has been mechanical injury with external or internal bleeding and simultaneous cyanide exposure.

UTC IHL

COPY TO LOCAL I.A.M.

MAY 18 '82 1746

PMC 1508

Supplier: Phillip Bros. Chem Middletown, Ct.

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

RECEIVED
JUL 2 1980
G. E. PARSONS

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME: Copper Pigment & Chemical Inc.	EMERGENCY TELEPHONE NO.: (201)-636-4300
ADDRESS (Number, Street, City, State, and ZIP Code): Arbor Street, Sewaren, N.J. 07077	
CHEMICAL NAME AND SYNONYMS: Potassium Cyanide	TRADE NAME AND SYNONYMS:
CHEMICAL FAMILY:	FORMULA: KCN

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
In contact with acids it liberates poisonous and flamable hydrocyanic acid gas. Not to be stored near nitrate-nitrite mixtures of peroxides.		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER: 1 part in 2 parts water.			
APPEARANCE AND ODOR: White deliquescent granular powder. Odor of HCN.			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES: Potassium Cyanide will not burn or support combustion. If exposed to water as thru perforations in steel containers potassium Cyanide will dissolve & small amounts of HCN gas may form by hydrolysis.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Do not use carbon dioxide type extinguishers.

PMC 1508

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE Large doses-patient becomes unconscious within a few seconds. Smaller doses-dizziness, con sion headache vomiting.

EMERGENCY AND FIRST AID PROCEDURES Carry patient to fresh air have him lie down. Remove contaminated clothing-keep patient warm. Start Treatment immediately using Cyanide first aid kit. Call physician.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE	X	CONDITIONS TO AVOID
	STABLE		

INCOMPATABILITY *(Materials to avoid)* All acids.

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

MAY 18 '82 1746

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Sweep up solids & dispose in proper fashion.

WASTE DISPOSAL METHOD Cyanide waste is treated with sodium hypochlorite at a pH 8.5 to 10.0. Dispose in accordance with local, state and federal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* Dust respirators approved by Bureau of Mines for dust.

VENTILATION	LOCAL EXHAUST	X	SPECIAL
	MECHANICAL *(General)*	X	OTHER

PROTECTIVE GLOVES

EYE PROTECTION Metal Safety spectacles with side shield.

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Do not store near acids, nitrate-nitrite mixtures. Store in dry area.

OTHER PRECAUTIONS Do not get in eyes, on skin or clothing.

Form Approved
Budget Bureau No. 44-R1387
Approval Expires April 30, 1971

UTC IHL

Supplier: Phillip Bros. Chem.
Middletown, Ct.

U.S. DEPARTMENT OF LABOR

WAGE AND LABOR STANDARDS ADMINISTRATION
Bureau of Labor Standards

PMC 1509

Form No. LS-002-4
May 1969

RECEIVED
JUL 2 1980
G. E. PARSONS

MATERIAL SAFETY DATA SHEET

MAY 18 '82 1746

SECTION I

MANUFACTURER'S NAME: Copper Pigment * Chemicals, Inc.	EMERGENCY TELEPHONE NO.: (201)-636-4300
ADDRESS (Number, Street, City, State, and ZIP Code): Arbor Street, Sewaren, N.J. 07077	
CHEMICAL NAME AND SYNONYMS: Copper Cyanide	TRADE NAME AND SYNONYMS: Cupticin
CHEMICAL FAMILY: Cyanide	FORMULA: $Cu(CN)_2$

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III PHYSICAL DATA

BOILING POINT (°F.) Melting Point °F	474	SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)	None	PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)	None	EVAPORATION RATE (_____=1)	None
SOLUBILITY IN WATER	Insoluble		
APPEARANCE AND ODOR	White to cream colored powder.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	Non-flammable	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA				
SPECIAL FIRE FIGHTING PROCEDURES				
UNUSUAL FIRE AND EXPLOSION HAZARDS	None			

PMC 1509

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: 150 to 180 mg.

EFFECTS OF OVEREXPOSURE: Poisoning may occur by ingestion, or inhalation of hydrogen cyanide liberated by the action of strong acids.

EMERGENCY AND FIRST AID PROCEDURES: Carry patient to fresh air have him lie down start treatment immediately using cyanide first aid kit. Call physician.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY (Materials to avoid): Acids, Oxydizing Agents

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen Cyanide

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Gather carefully and flush with water into the waste treatment system. Do not let it get in touch with acids or oxydizing materials.

WASTE DISPOSAL METHOD: As prescribed for cyanides and heavy metals by the local, state and federal regulations.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type): Respirators of approved type

VENTILATION	LOCAL EXHAUST: Operating areas should be provided with adequate ventilation.	SPECIAL	
	MECHANICAL (General)	OTHER	

PROTECTIVE GLOVES: Gauntlet type rubber

EYE PROTECTION: Chemical safety glasses

OTHER PROTECTIVE EQUIPMENT: Rubber or plastic clothing to avoid skin contact.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Do not ship or store next to strong acids or oxydizing agents.

OTHER PRECAUTIONS: Do not get in eyes, on skin or clothing.

UTC THL @ 32

Allied Chemical
An ALLIED Company

PRODUCT SAFETY DATA SHEET

SODA ASH

PMC 1510

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME OR SYNONYM)		X C.A.S. NO ☐ ALLIED PRODUCT CODE #
Soda Ash	RECEIVED BY JUN 16 1983 G. E. PARSONS	497-19-8

CHEMICAL NAME	
Sodium Carbonate	

FORMULA	MOLECULAR WEIGHT
Na_2CO_3	105.99

ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)

Allied Chemical
P.O. Box 1139R
Morristown, N.J. 07960

CONTACT	PHONE NUMBER	ISSUED DATE	REVISED DATE
Director, Product Safety	(201) 455-4157	June 12, 1980	Nov., 1982

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER
(201) 455-2000

Skin: Wash with plenty of water.
Eyes: Flush with plenty of water for at least 15 minutes and get medical attention.
Ingestion: Drink large quantity of water to dilute the material. Do not induce vomiting.
Get medical attention for irritation, ingestion or discomfort from inhalation.

C. HAZARDS INFORMATION

HEALTH

INHALATION
Inhalation of product dust may irritate nose, throat and lungs.

INGESTION
Although low in toxicity, ingestion can be harmful - consult a physician.
May irritate mouth, esophagus, stomach, etc. LD_{50} (rat): 2.8 gm/kg. See reference (a).

SKIN
May cause skin irritation from prolonged contact.

EYES
May irritate or burn eyes.

PERMISSIBLE CONCENTRATION: AIR (SEE SECTION J) None established **BIOLOGICAL**
No TLV established.

UNUSUAL CHRONIC TOXICITY

C. HAZARDS (Cont.)

NA – Not Applicable

PMC 1510

FIRE AND EXPLOSION

FLASH POINT °C	AUTO IGNITION TEMPERATURE °C	FLAMMABLE LIMITS IN AIR (% BY VOL.)
Not Flammable EN CUP ☐CLOSED CUP	NA	NA

UNUSUAL FIRE AND EXPLOSION HAZARDS

D. PRECAUTIONS/PROCEDURES

FIRE EXTINGUISHING AGENTS RECOMMENDED

NA

FIRE EXTINGUISHING AGENTS TO AVOID

NA

SPECIAL FIRE FIGHTING PRECAUTIONS

NA

VENTILATION

Local exhaust if dusty condition prevails.

NORMAL HANDLING

Avoid eye contact or prolonged skin contact. Avoid breathing dust. When dissolving, add to water cautiously and with stirring; solutions can get hot.

RAGE

Store in a cool, dry area away from acids. Prolonged storage may cause product to cake from atmospheric moisture.

SPILL OR LEAK

Shovel up dry chemical into an empty container with a cover. Flush residue with plenty of water. (See Section I for disposal methods).

SPECIAL PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS

Avoid simultaneous exposure to soda ash and lime dust. In the presence of moisture the two materials combine to form caustic soda (NaOH), which may cause burns. Label signal word: "CAUTION!"

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

Where required, use a respirator approved by NIOSH for product dusts.

EYES AND FACE

Wear hard hat (or other head covering) and chemical safety goggles.
Do not wear contact lenses.

HANDS, ARMS, AND BODY

Wear long sleeve shirt and trousers, and gloves for routine product use.
...tton gloves are sufficient for dry product, wear impervious gloves when handling solutions.

OTHER CLOTHING AND EQUIPMENT

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F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS):	APPEARANCE AND ODOR	
☐ LIQUID ☒ SOLID ☐ GAS ☐ _____	White powder. Odorless.	
BOILING POINT °C MELTING POINT 854°C	SPECIFIC GRAVITY (H_2O = 1) 2.533	VAPOR DENSITY (AIR = 1) NA
SOLUBILITY IN WATER (% by Weight) 17% solution at 20°C	pH 1% solution; pH = 11.3	VAPOR PRESSURE (mm Hg at 20° C) NA
EVAPORATION RATE (Butyl Acetate = 1) ☐ (Ether = 1) ☒ NA	% VOLATILES BY VOLUME (At 20° C) NA	

G. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	

INCOMPATIBILITY (MATERIALS TO AVOID)

Contact with acids will release carbon dioxide gas.

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT/C.A.S. #	WT. %	HAZARD DATA (SEE SECT. J)
NA		

PMC 1510

I. ENVIRONMENTAL

DEGRADABILITY/AQUATIC TOXICITY	OCTANOL/WATER PARTITION COEFFICIENT

EPA HAZARDOUS SUBSTANCE? ☐ YES ☒ NO IF SO, REPORTABLE QUANTITY: _____ # — 40 CFR 116-117

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)

If permitted by applicable disposal regulations, bury in a solid waste landfill or dissolve and neutralize as follows: Dissolve in water using caution as solution can get hot. Neutralize with acid and flush to sewer with plenty of water. Good ventilation is required during neutralization due to release of CO_2 gas. Neutralized waste may have to be disposed of by an approved contractor.

RCRA STATUS OF UNUSED MATERIAL: Not a hazardous waste. — 40 CFR 261

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

REGULATORY STANDARDS — D.O.T. CLASSIFICATION: Not regulated — 49 CFR

NERAL

(a) Allied Chemical data, unpublished.

K. ADDITIONAL INFORMATION

This product is not for food or drug use.

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WAGE AND LABOR STANDARDS ADMINISTRATION

Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

UTC IN LAB

SECTION I

MANUFACTURER'S NAME: American Chemical & Refining Company, Inc. Mark Chagnon	EMERGENCY TELEPHONE NO.: 203-757-9231
ADDRESS (Number, Street, City, State, and ZIP Code): 36 Sheffield Street Waterbury, CT 06704	
CHEMICAL NAME AND SYNONYMS: Argenous Cyanide	TRADE NAME AND SYNONYMS: Silver Cyanide
CHEMICAL FAMILY: Cyanide	FORMULA: AgCN

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS		%	TLV (Units)	ALLOYS AND METALLIC COATINGS		%	TLV (Units)
PIGMENTS	None			BASE METAL	None		
CATALYST	None			ALLOYS	None		
VEHICLE	None			METALLIC COATINGS	None		
SOLVENTS	None			FILLER METAL PLUS COATING OR CORE FLUX	None		
ADDITIVES	None			OTHERS	None		
OTHERS	None						

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
N.A.*		

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	N.A.*	SPECIFIC GRAVITY (H_2O=1)	3.95
VAPOR PRESSURE (mm Hg.)	N.A.*	PERCENT VOLATILE BY VOLUME (%)	N.A.*
VAPOR DENSITY (AIR=1)	N.A.*	EVAPORATION RATE (_____ =1)	N.A.*
SOLUBILITY IN WATER @ 20°C	0.0023%		
APPEARANCE AND ODOR	White or grayish, odorless powder		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	None	FLAMMABLE LIMITS	Lel	Uel
		None		
EXTINGUISHING MEDIA	Non-flammable			
SPECIAL FIRE FIGHTING PROCEDURES	None			
UNUSUAL FIRE AND EXPLOSION HAZARDS	Contact with acids or acid salts will liberate highly toxic and flammable hydrocyanic acid gas.			

*N.A. - not applicable

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SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
5 mg/M^3 (as CN) - skin

EFFECTS OF OVEREXPOSURE
Highly toxic, weakness, dizziness, confusion, headache, vomiting, unconsciousness.

EMERGENCY AND FIRST AID PROCEDURES
Give prompt treatment. Maintain respiration. Administer amyl nitrite.

Follow instructions on label.

SECTION VI REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	

INCOMPATABILITY (Materials to avoid)
Contact with acids or acid salts releases poisonous gas.

HAZARDOUS DECOMPOSITION PRODUCTS
Hydrogen cyanide.

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Do not breathe gas or dust. Do not get in eyes, on skin or on clothing.

WASTE DISPOSAL METHOD

Sweep up spillage. Send to a refinery for disposal. Do not flush to sewer which may contain acids.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
Use dust respirator (U.S. Bureau of Mines approved) when handling under dusty conditions.

VENTILATION		
	LOCAL EXHAUST: Maintain adequate ventilation	SPECIAL: Air or oxygen in emergencies
	MECHANICAL (General)	OTHER

PROTECTIVE GLOVES	EYE PROTECTION
Used when handling material	Chemical safety goggles

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Wash thoroughly after handling. Keep container closed and away from acids.

Store in dry place. Keep away from feed and foodstuffs. (storage and work areas)

OTHER PRECAUTIONS
Wash contaminated clothing before reuse.

Form Approved
Budget Bureau No. 44-R1387
Approval Expires April 30, 1971

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Form No. LSB-0
May

U.S. DEPARTMENT OF LABOR

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Bureau of Labor Standards

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MATERIAL SAFETY DATA SHEET

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SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
IMC CHEMICAL GROUP, INC.	617-268-5100
ADDRESS (Number, Street, City, State, and ZIP Code) 52 Sobin Park, Boston, Massachusetts 02210	
CHEMICAL NAME AND SYNONYMS POTASSIUM CARBONATE, CARBONATE OF POTASH	TRADE NAME AND SYNONYMS POTASSIUM CARBONATE
CHEMICAL FAMILY ALKALI	FORMULA K_2CO_3 (Hydrated or Calcined)

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	N A	SPECIFIC GRAVITY (H_2O=1)	N A
VAPOR PRESSURE (mm Hg.)	N A	PERCENT VOLATILE BY VOLUME (%)	N A
VAPOR DENSITY (AIR=1)	N A	EVAPORATION RATE (______ =1)	N A
SOLUBILITY IN WATER			
APPEARANCE AND ODOR	Odorless white hygroscopic granular material		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

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SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: None

EFFECTS OF OVEREXPOSURE: Causes skin and mucous membrane irritation

EMERGENCY AND FIRST AID PROCEDURES
Remove from skin as soon as possible. Flush area thoroughly with water. For eyes flush for 15 minutes with water, get immediate medical attention.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*: Acids

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD: Dissolve and wash away with large quantities of water.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*: Nose mask

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES: None

EYE PROTECTION: None

OTHER PROTECTIVE EQUIPMENT: None

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

OTHER PRECAUTIONS

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Form Approved
Budget Bureau No. 44-R1387
Approval Expires April 30, 1971

Form No. LSB-005-4
May 1969

U.S. DEPARTMENT OF LABOR

WAGE AND LABOR STANDARDS ADMINISTRATION
Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

DISTRIBUTED BY:
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NEWARK, N.J. 07114
(201) 242-0200

October, 1971

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SECTION I

MANUFACTURER'S NAME: Monsanto Company	EMERGENCY TELEPHONE NO.: (314) 694-1000
ADDRESS (Number, Street, City, State, and ZIP Code): 800 North Lindbergh Blvd., St. Louis, Missouri 63166	
CHEMICAL NAME AND SYNONYMS: Sodium Phosphate Tribasic - Crystalline	TRADE NAME AND SYNONYMS: TSP Crystalline
CHEMICAL FAMILY: Sodium Phosphates	FORMULA: $4(Na_3PO_4 \cdot 12H_2O) \cdot NaOH$

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Not a hazardous material as defined in 29 CFR Section 1501.2		
which pertains to this data sheet.		

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	NA	SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)	NA	PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____=1)	
SOLUBILITY IN WATER	Appreciable		
APPEARANCE AND ODOR	White product - No odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	NA	FLAMMABLE LIMITS	Lel	Uel
		NA		
EXTINGUISHING MEDIA	NA			
SPECIAL FIRE FIGHTING PROCEDURES	NA			
UNUSUAL FIRE AND EXPLOSION HAZARDS	NA			

While the information and recommendations set forth herein are believed to be accurate as of the date hereof, MONSANTO COMPANY MAKES NO WARRANTY WITH RESPECT THERETO AND DISCLAIMS ALL LIABILITY FROM RELIANCE

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SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	None established.
EFFECTS OF OVEREXPOSURE	May cause skin irritation - Severe eye irritant.
EMERGENCY AND FIRST AID PROCEDURES	Skin - Flush with water.
	Eye - Flush with water for at least 15 minutes - Get medical attention.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Normal good housekeeping procedures.

WASTE DISPOSAL METHOD Landfill.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*

VENTILATION	LOCAL EXHAUST If dust is a problem.	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES	Good practice.	EYE PROTECTION	Yes - goggles.

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Normal good housekeeping practices.

OTHER PRECAUTIONS

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Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Pfizer Chemical Division	212-573-1456
ADDRESS (Number, Street, City, State, and ZIP Code) 235 E. 42nd St. New York, N.Y. 10017	
CHEMICAL NAME AND SYNONYMS Rochelle Salt, USP, FCC	TRADE NAME AND SYNONYMS Potassium Sodium Tartrate -- Sodium Potassium Tartrate
CHEMICAL FAMILY Aliphatic Acid salt	FORMULA $KNaC_4H_4O_6 \cdot 4H_2O$

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS Not			BASE METAL Not		
CATALYST Applicable			ALLOYS Applicable		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Not Applicable (not a mixture)		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	Not Applicable	(solid)	SPECIFIC GRAVITY (H_2O=1)	1.790
VAPOR PRESSURE (mm Hg.)	Not Applicable		PERCENT, VOLATILE BY VOLUME (%) At 100°C, loses	$3H_2O$
VAPOR DENSITY (AIR=1)	Not Applicable		EVAPORATION RATE (_____=1) Not Applicable	
SOLUBILITY IN WATER	at 26°C	66g/100 ml	Melting Point	70°-80°C
APPEARANCE AND ODOR	White crystalline powder, odorless, cooling saline taste.			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
Not Established	Solid		

EXTINGUISHING MEDIA: If involved in fire, water or CO_2 may be used.

SPECIAL FIRE FIGHTING PROCEDURES: None normally required.

UNUSUAL FIRE AND EXPLOSION HAZARDS: None

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA PmC 1518

THRESHOLD LIMIT VALUE
Not established (generally recognized as safe for use in foods).

EFFECTS OF OVEREXPOSURE
As with other mild organic salts, excessive contact may cau
eye irritation, or minor skin or respiratory irritation.

EMERGENCY AND FIRST AID PROCEDURES

Flush skin contact with water and flush eye contact immediately with plenty of water. Get medical care for eyes if irritation persists.

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		Not Applicable
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*
Acids, calcium or lead salts, magnesium sulfate, silver nitrate.

HAZARDOUS DECOMPOSITION PRODUCTS
Not Established

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		Not Applicable
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

A normal brush down and wash up

WASTE DISPOSAL METHOD

Any normal disposal procedure which is in conformance with pertinent federal, state or local regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
None normally required

VENTILATION		
	LOCAL EXHAUST: Dust exhaust at point of use	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES	EYE PROTECTION
Standard work gloves	Chemical goggles

OTHER PROTECTIVE EQUIPMENT
None

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Store in tightly closed containers.

OTHER PRECAUTIONS
Do not ingest; relatively large doses (2-4 g in adults) can have a cathartic effect.

GPO 934-140

PMC 1578

ISSUE DATE: 4/88

MATERIAL SAFETY DATA SHEET

MANUFACTURER/ADDRESS
Pfizer Chemical Division
235 East 42nd St.
New York, N.Y. 10017

PRODUCT IDENTIFICATION

PFIZER PRODUCT NAME: Rochelle Salt, USP/FCC

PFIZER MSDS NO.: R002

EMERGENCY PHONE NUMBER(S): (718)-780-8456

CHEMICAL NAME AND MOLECULAR FORMULA: Potassium Sodium Tartrate $KNaC_4H_4O_6 \cdot 4H_2O$

CAS NO.(S): 304-59-6

SYNONYMS: Sodium Potassium Tartrate

CHEMICAL FAMILY: Aliphatic Acid Salt

HAZARDOUS COMPONENTS

MATERIALS OR COMPONENTS	%	HAZARD DATA (TLV, LD50, LC50, etc.)
Material is a single component entity.		

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PHYSICAL PROPERTIES

BOILING POINT (°F)	Not Applicable-Solid	SPECIFIC GRAVITY (H_2O = 1)	Not Applicable-Solid
VAPOR PRESSURE (mm Hg.)	Not Applicable-Solid	PERCENT VOLATILE BY VOLUME (%)	Not Applicable-Solid
VAPOR DENSITY (AIR = 1)	Not Applicable-Solid	EVAPORATION RATE (= 1)	Not Applicable-Solid
SOLUBILITY IN WATER	Appreciable	pH 10 % SOLN	7 - 8
APPEARANCE & ODOR	White crystalline powder, odorless with cooling saline taste.		

FIRE & EXPLOS. DATA

FLASH POINT (Method used)	Not Applicable	FLAMMABLE LIMITS	Lel: NA / Uel: NA
EXTINGUISHING MEDIA	If involved in fire, extinguish with water, foam or CO_2.		
SPECIAL FIRE FIGHTING PROCEDURES	None Required		
UNUSUAL FIRE AND EXPLOSION HAZARDS	None Reported		

REACTIVITY DATA

STABILITY	UNSTABLE:		CONDITIONS TO AVOID: Avoid exposure to high temperatures (loses water).
	STABLE: XX		
INCOMPATIBILITY (Materials to avoid)	Strong acids, silver nitrate, calcium, lead or magnesium salts.		
HAZARDOUS DECOMPOSITION PRODUCTS	None Known		

HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID
May Occur	Will Not Occur	
	XX	Not Applicable

PMC 1578

TOXICITY

ORAL/PARENTERAL: No Data Available

DERMAL (acute): No Data Available

EYE: No Data Available

INHALATION: No Data Available

CHRONIC:

Generally recognized as safe. No specific data available. Rat feeding of disodium tartrate where 1150mg/kg was fed for 17 days without fatalities. Increased levels of 3680mg/kg for 19 days, killed 3 of 6 test animals.

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
	Not Listed	Not Listed	No

PMC 1518

HEALTH HAZARD INFORMATION

Effects of Exposure

ORAL INGESTION
Generally recognized as safe for use in foods or as a laxative. Adverse effects, dependent on amount ingested, include nausea, vomiting, diarrhea, abdominal pain, thirst and possibly cardiovascular collapse and/or renal failure

EYE CONTACT
May, due to the dusting, be a mild irritation.

SKIN CONTACT
Direct, prolonged contact may cause irritation.

INHALATION
Dusts may be slightly irritating to the respiratory tract.

Emergency First Aid

ORAL INGESTION
Dependent on the amount ingested and if victim is conscious, give 2-3 glasses of water and induce vomiting.

EYE CONTACT
Wash contacted eye with plenty of water for at least 15 minutes. Seek medical assistance should irritation persist.

SKIN CONTACT
Wash contacted area with water. Launder contaminated clothing before reuse.

INHALATION
Remove victim to source of fresh air.

SPILL OR LEAK

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Sweep/scoop material into recovery containers. Flush area with water to remove final traces.

WASTE DISPOSAL METHOD (Comply with applicable federal, state, and local regulations.)

Comply with applicable federal, state or local regulations. Consider landfill or incineration.

SPECIAL PROTECTION INFO.

RESPIRATORY PROTECTION (Specify type)
Normal dust stop mask.

VENTILATION			
	LOCAL EXHAUST	Sufficient to control	SPECIAL None
	MECHANICAL (general)	dust.	OTHER None

PROTECTIVE GLOVES
Normal Work Gloves

EYE PROTECTION
Safety Glasses

OTHER PROTECTIVE EQUIPMENT
None Required

SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Avoid exposure to higher than normal storage temperatures.

OTHER PRECAUTIONS

None Required

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INDUSTRIAL HYGIENE

MATERIAL SAFETY DATA SHEET

(R) 2/22/88 CODE 16561

SECTION 1

Manufacturer's Name MacDermid Incorporated	EMERGENCY TELEPHONE 203-575-5700
ADDRESS (Number, Street, City, State, Zip Code) 526 Huntingdon Avenue Waterbury, CT. 06708	MFSA EMERGENCY 24 HO HOTLINE: (Medical) (313) - 644 - 5626
CFR-49 - DOT Proper Shipping Name Non-hazardous Material	
CHEMICAL NAME AND SYNONYMS N/A	TRADE NAME AND SYNOM Rocheltex
CHEMICAL FAMILY Organic Salts	FORMULA Mixture

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVE & SOLVENTS	%	TLV (UNITS)	ALLOYS & METALLIC COATINGS	%	TLV (UNIT
	N/A			N/A	
PIGMENTS	"		BASE METAL	"	
CATALYST	"		ALLOYS	"	
VEHICLE	"		METALLIC COATINGS	"	
SOLVENTS	"		FILLER METAL PLUS OR CORE FLUX	"	
ADDITIVES	"		OTHERS	"	
OTHERS	"				

HAZARDOUS MIXTURES OR OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (UNI
Potassium Hydroxide (1310-58-3)	25-40	2 mg/M

SECTION III - PHYSICAL DATA

BOILING POINT (F)	> 212	SPECIFIC GRAVITY (H_2O = 1)	1.2
VAPOR PRESSURE (MM. HG.)	Aqueous	PERCENT VOLATILE BY VOLUME (%)	N/
VAPOR DENSITY (AIR = 1)	"	EVAPORATION RATE (= 1)	Aque
SOLUBILITY IN WATER	Complete		

APPEARANCE AND ODOR
Clear, pale yellow liquid - slight odor

SECTION IV = FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) Non-flammable		FLAMMABLE LIMITS N/A	LEL / U
EXTINGUISHING MEDIA As for surrounding materials			
SPECIAL FIRE FIGHTING PROCEDURES Wear self-contained breathing apparatus			
UNUSUAL FIRE AND EXPLOSION HAZARDS Will produce acrid fumes under fire conditions.			

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SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

Not established for product. See Section II

EFFECTS OF OVEREXPOSURE UNLESS OTHERWISE STATED CHRONIC OR LONG-TERM HEALTH EFFECTS UNKNOWN!

Irritation to eyes, skin and mucous membranes

EMERGENCY AND FIRST AID PROCEDURES

EYES: Flush with water for 15 minutes. Contact physician.
SKIN: Wash thoroughly with water.
INTERNAL: Give water, contact physician. Do not induce vomiting
INHALATION: Remove to fresh air.

SECTION VI - REACTIVITY DATA

UNSTABLE		**CONDITIONS TO AVOID**
STABLE	X	N/A

INCOMPATIBILITY (MATERIALS TO AVOID)

Strong acids

HAZARDOUS DECOMPOSITION PRODUCTS

None known

HAZARDOUS POLYMERIZATION		**CONDITIONS TO AVOID**
MAY OCCUR		N/A
WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED - WEAR PROTECTIVE CLOTHING.
NEVER DISCHARGE DIRECTLY INTO SEWERS OR WATERWAYS

Flush to chemical drain with cold water.

WASTE DISPOSAL METHOD - ALWAYS CHECK AND COMPLY WITH GOVERNMENT DISPOSAL REGUALTIONS

Neutralize carefully with dilute acid to pH 6-8. Discharge liquid to chemical drain according to local, state, federal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)

Not normally required if area well ventilated.

VENTILATION	**LOCAL EXHAUST**	**SPECIAL**
	N/A	N/A
	MECHANICAL (GENERAL)	**OTHER**
	X	N/A

PROTECTIVE GLOVES	**EYE PROTECTION**
Rubber	Splash proof goggles/face shield

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep in closed containers in a cool, dry location away from strong acids.

OTHER PRECAUTIONS

Avoid eye and skin contact. Always wash clothing before re-use.

PREPARED BY: MacDermid Incorporated **DATE:** 2/22/88

16561

SAFETY & WARNING INFORMATION

Industrial Hygiene – General Requirements

(To be attached to every MacDermid Material Safety Data Sheet.)

INGESTION
All food should be kept in a separate area away from the working location. Eating, drinking, smoking and carrying of tobacco products should be prohibited in areas where there is a potential for significant exposure to this material. Before eating, drinking or smoking, hands and face should be thoroughly washed.

SKIN CONTACT
Skin contact should be prevented through the use of impervious clothing, gloves and footwear. A face shield should be worn when use conditions could result in exposure to the material.

EYE CONTACT
Eye contact should be prevented through the use of chemical safety glasses, goggles or face shield.

INHALATION
This material should only be handled in open or well-ventilated areas. Where adequate ventilation is not available and there is possibility of vapor, aerosol or mist generation, control of inhalation can be achieved through the use of a NIOSH-approved, half-face-piece cartridge, air-purifying respirator.

General Storage Requirements for Hazardous Materials

CORROSIVE MATERIALS
Corrosive materials must not be above, below or adjacent to: Flammable Solids, Oxidizing Materials, Cyanide Bearing Materials (Poison).

FLAMMABLE LIQUIDS
Keep Flammable Liquids in a segregated area, preferably outside of your facility or in a Flammable Liquid storage cabinet.

DOUBLE LABELED MATERIALS
(Example: Corrosive Liquid, Poisonous NOS). Primary hazard is Corrosive, secondary hazard is Poison. Consider both hazards in storing the material. In this example, do not store near Flammable Solids, Oxidizing or Cyanide Bearing materials because of the corrosive element. Preferably keep double labeled materials separate from all other diamond labeled materials.

ACIDS/ALKALINES
Acid bearing material should be stored separate from Alkaline bearing material.

MacDermid INCORPORATED
(203) 575-5700

+ EMERGENCY DIRECTORY ASSISTANCE
(313) 644-5626

mfsa

UTC IHL
R-3/29/79
ARD:rs

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PMC 1519 Revised

U. S. DEPARTMENT OF LABOR

WAGE AND LABOR STANDARDS ADMINISTRATION

Bureau of Labor Standards

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CODE: 16561

G. E. PARSONS

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
MACDERMID, INC.	203-754-6161
ADDRESS (Number, Street, City, State, and ZIP Code)	
526 HUNTINGDON AVENUE, WATERBURY, CONNECTICUT 06720	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
	Rocheltex
CHEMICAL FAMILY	FORMULA

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS	--		BASE METAL	--	
CATALYST	--		ALLOYS	--	
VEHICLE	--		METALLIC COATINGS	--	
SOLVENTS	--		FILLER METAL PLUS COATING OR CORE FLUX	--	
ADDITIVES	--		OTHERS	--	
OTHERS	--				

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Potassium Hydroxide	2	2 mg/M^3

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	> 212	SPECIFIC GRAVITY (H_2O=1)	1.280
VAPOR PRESSURE (mm Hg.)	Aqueous	PERCENT VOLATILE BY VOLUME (%)	NA
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____ =1)	NA
SOLUBILITY IN WATER	Complete		
APPEARANCE AND ODOR	Clear, pale yellow liquid. Slight odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	Non Flammable Liquid	FLAMMABLE LIMITS	LEL	UEL
		NA		
EXTINGUISHING MEDIA	As required for surrounding fire.			
SPECIAL FIRE FIGHTING PROCEDURES	None			
UNUSUAL FIRE AND EXPLOSION HAZARDS	None			

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SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	Not established for product. See Section II.
EFFECTS OF OVEREXPOSURE	Irritation to eyes, skin, and mucous membranes.
EMERGENCY AND FIRST AID PROCEDURES	Eyes - wash with water for 15 minutes - contact physicia
	Skin - wash thoroughly with water.
	Internal - Give water - contact physicism.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATABILITY (Materials to avoid)	Strong acids		
HAZARDOUS DECOMPOSITION PRODUCTS	Oxides of carbon		
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	Flush to drain with cold water.
WASTE DISPOSAL METHOD	Neutralize carefully with dilute acid. Discharge liquid to drain.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)	Not normally required		
VENTILATION	LOCAL EXHAUST		SPECIAL
	MECHANICAL (General)	X	OTHER
PROTECTIVE GLOVES	Rubber	EYE PROTECTION	Splash proof goggles/face shield
OTHER PROTECTIVE EQUIPMENT	Rubber apron		

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	Keep in closed containers in a cool, dry location away from strong acids.
OTHER PRECAUTIONS	

#16561

PMC 1523

ENTHONE
INCORPORATED

MATERIAL SAFETY DATA SHEET

ALUMON®

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MAY 4 1988
INDUSTRIAL HYGIENE

P.O. BOX 1900
NEW HAVEN, CT 06508

EMERGENCY PHONE NUMBERS				PRODUCT CODE#:	2200
PLANTS	203-934-8611	(8:30am-5pm	EST)	DATE ISSUED:	5/4/87
	312-598-3210	(8:30am-5pm	CST)	SUPERCEDES:	7/86
MFSA	313-644-5626	(24 hours)		PREPARER:	J.A. Zehnder
CHEMTREC	800-424-9300	(Transportation)			

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV
Sodium hydroxide	Caustic soda	1310-73-2	2 mg/m3	2 mg/m3(1)
Zinc oxide		1314-13-2	15 mg/m3(2)	10mg/m3(2)
Sodium cyanide		143-33-9	5 mg/m3(3)	5 mg/m3(3)
Cuprous cyanide	copper cyanide	544-92-3	5 mg/m3(3)	5mg/m3(3)

(1) Ceiling value (2) as dust (3) Skin contact

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	NI	BOILING POINT, °F	NA
EVAP.RATE (BUTYL ACETATE=1)	NA	MELTING POINT, °F	NI
VAPOR PRESSURE, mm-Hg	NA	SOLUBILITY IN WATER	essentially complete
VAPOR DENSITY (AIR=1)	NA	APPEARANCE	light grey powder
pH (AS IS)	NA	ODOR	caustic

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	NA	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[X] Not Combustible [X] Water fog or spray [ ] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear self-contained breathing apparatus (SCBA) and complete personal protective equipment when potential for exposure to vapors or products of combustion exists.

UNUSUAL FIRE AND EXPLOSION HAZARDS

In the presence of water, material may react with amphoteric metals (such as aluminum, zinc, or tin) generating hydrogen gas which will burn or explode if ignited.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Inhalation of dust may be fatal and can cause severe burns to upper respiratory tract.

INGESTION: Small amounts can cause death.

SKIN: Absorption through skin may be fatal.
May cause irritation, rash.

EYES: Causes severe burns with damage to eyes and possible blindness.

EFFECTS OF CHRONIC EXPOSURE:

May range from general discomfort to convulsions and death depending on severity of exposure.

CARCINOGEN: Not listed by NTP, IARC, OSHA

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Lay down victim in fresh air. If victim is unconscious and not breathing, resuscitate and simultaneously administer amyl nitrite as prescribed by your First Aid Policy. If conscious, administer oxygen and if necessary, amyl nitrite antidote. Keep victim quiet and warm. Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person. Give victim suitable antidotes while administering oxygen. Follow Company Policy concerning administration of antidotes, or water, and inducing vomiting. Seek immediate medical attention.

SKIN: Wash skin to remove cyanide while removing all contaminated clothing, including shoes. Do not delay. Skin absorption can occur from cyanide dust, solutions, or HCN vapor.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes holding lids apart to ensure flushing of entire surface. Washing eyes within several seconds of exposure is essential to minimize damage. Seek immediate medical attention.

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VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:

Do not inhale dust. Avoid contact with skin, eyes and clothing. Wear protective equipment. Sweep or shovel into closed container and cover. Flush spill area with dilute solution of sodium or calcium hypochlorite. Dispose of according to Local, State and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:

Store in a cool, dry place. Keep away from acids and oxidizers. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:

Wash thoroughly after handling.
Decontaminate clothing before disposal.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL.
Self-contained respirator is preferred.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [X] Face shield

PROTECTIVE GLOVES: [X] Neoprene [ ] Natural rubber Other: Butyl rubber

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Chemically resistant coveralls, hat, and shoes or boots.

WORK / HYGENIC PRACTICES:

Do not consume, handle or store food, beverages or tobacco in areas where this product is present.

ADDITIONAL INFORMATION:

For waste disposal of operating solutions consult Enthone Waste Disposal Procedures. For major spills consult Enthone for disposal assistance. Dispose of in accordance with local, state, and federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200
PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

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U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

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MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
ENTHONE, INC.	203 - 934-8611

ADDRESS (Number, Street, City, State, and ZIP Code): P. O. Box 1900, New Haven, CT 06508

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
N/A	ALUMON®

CHEMICAL FAMILY	FORMULA

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES		%	TLV (Units)
DOT Class Label	Caustic Soda	80	2 mg/M
Poison B Poison - Cyanide Mix Dry	Cyanide, as CN	2	5 mg/M
	Zinc Oxide	< 20	5 mg/M
	Balance is non-hazardous		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	-	SPECIFIC GRAVITY (H_2O=1)	-
VAPOR PRESSURE (mm Hg.)	-	PERCENT, VOLATILE BY VOLUME (%)	-
VAPOR DENSITY (AIR=1)	-	EVAPORATION RATE (_____ =1)	-
SOLUBILITY IN WATER	soluble		
APPEARANCE AND ODOR	white to light grey powder with caustic odor		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	None	FLAMMABLE LIMITS	Lel	Uel
EXTINGUISHING MEDIA	Not Flammable			

SPECIAL FIRE FIGHTING PROCEDURES: Avoid using water on the product. The use of water will generate large quantities of the heat by reaction with the sodium hydroxide and may cause spattering. Use of water will dissolve the sodium cyanide and may thus spread the cyanide into sewers or drains where acid conditions may cause the liberation of highly toxic HCN.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Contact of the product with water may cause liberation of small amounts of toxic HCN which will be destroyed in a flaming fire. Heat may release volatile HCN which is very poisonous. Contact of the product with acids, acid salts, or acidic rinses liberates highly toxic and flammable HCN gas. In water solution, product may react with metals to generate hydrogen gas which is flammable.

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(Continue on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	N/A
EFFECTS OF OVEREXPOSURE	May be fatal if swallowed or if dust or mist from solution is inhaled. Inhalation of highly toxic hydrocyanic acid, generated by contact of the product with acid, may be fatal. Product may cause severe skin and eye burns.
EMERGENCY AND FIRST AID PROCEDURES	- Always have on hand cyanide antidote kits and Amyl Nitrite.
EXTERNAL:	Flush skin or eyes with plenty of cool water for 15 minutes while removing contaminated clothing and shoes; for eyes also get immediate medical attention.
INHALATION:	Remove patient to fresh air. Have patient lie down and keep warm. If breathing has stopped, apply artificial repiration. Administrer amyl nitrite by inhalation for ½ - ½ of every minute. Apply oxygen if available. Summon an ambulance to take patient to hospital. Cyanide Antidote Kit should accompany patient in ambulance.

SECTION VI - Reactivity Data

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE shelf life	1 yr.	
INCOMPATABILITY *(Materials to avoid)*	Moisture, oxidizers, acids (very important)		
HAZARDOUS DECOMPOSITION PRODUCTS	in a fire - cyanides, cyanogen		
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	x	Unless subject to high heat or contact with acids (then toxic HCN will be formed)

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SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	Stay upwind. Keep acid away from area. Do not breathe gas, dust or mist from product or solutions. Avoid contact with skin, eyes and clothing. Keep product dry if at all possible. Contain spill! Prevent material from getting into waters or into sewers. If spilled into waters or sewers, notify proper authorities immediately. If in solution prevent contact with metals as hydrogen may be generated.
WASTE DISPOSAL METHOD	for spills and leaks: If material is in dry state, shovel up into steel containers, sweep up all powder, dam area and treat residual with sodium hypochlorite to destroy remaining cyanide. If material is in solution, contain spill and absorb on sand or gravel. Shovel up into steel containers. Take solids to chemical waste treatment facility for chlorination to destroy cyanide.

For Waste Disposal of Operating Solution, Consult Enthone Operating Instructions.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*	Type for caustic mist.		
VENTILATION	LOCAL EXHAUST Yes, for operating solution of Alumon.	SPECIAL	
	MECHANICAL *(General)*	OTHER	
PROTECTIVE GLOVES	Yes, rubber	EYE PROTECTION	Yes, goggles
OTHER PROTECTIVE EQUIPMENT	apron		

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	Keep dry; store indoors at max. of 120°F.; avoid contact with moisture, oxidizers, acids.
OTHER PRECAUTIONS	Avoid dust inhalation. Wear gloves, apron, goggles at all times when handling. Avoid all contact with acids or acidic materials as such contact will release poisonous gas. Avoid contact of the powder with oxidizing agents as violent reaction may occur.

PMC 1530

Manufacturer's Name & Address:
AMERICAN CHEMICAL & REFINING CO., INC.
CONTACT: MR. KALMAN Le BOW
36 SHEFFIELD ST., P.O.BOX 120
WATERBURY, CT 06720

Emergency Telephone Number:
(203) 757-9231

Chemtrec Toll Free Number:
(800) 424-9300

Section 01 : General Information

Common Name: POTASSIUM SILVER CYANIDE
Chemical Name: POTASSIUM SILVER CYANIDE
Chemical Family: CYANIDE SALT
Chemical Formula: KAg(CN)2
Preparation Date: 070787
Last Revision Date: 012388
Revision Number: 8701B

Section 02 : Hazardous Ingredients

Section 2A: Hazardous Ingredients

L/I	Chemical & Common Name	CAS-Reg-No	%'age	Applicable Exposure Limit PEL-OSHA	TLV-ACGIH
1.	Potassium Silver Cyanide	506-61-6	100	.01mg/m3asAg	.01mg/m3asAg

Section 2B: Carcinogenic Ingredients

L/I	Chemical & Common Name	CAS-Reg-No	%'age	Reference Source IARC	OSHA
1.	None				

Section 2C: Mutagenic Ingredients

L/I	Chemical & Common Name	CAS-Reg-No	%'age	Reference Source IARC	OSHA
1.	None				

Section 2D: Teratogenic Ingredients

L/I	Chemical & Common Name	CAS-Reg-No	%'age	Reference Source IARC	OSHA
1.	None				

Section 03 : Health Hazard Data

Acute Health Effects:
Toxic effect studies in animals showed overexposure may lead to asphyxia, dyspnea, ataxia, tremors, coma and eventual death caused by the interruption of the metabolic process.

PMC 1530

Human health effects of overexposure initially include: skin irritation with discomfort or rash, eye irritation or burns with tearing or blurred vision and very possibly permanent eye damage. There can be nonspecific discomfort such as nausea, headaches, dizziness, vomiting and weakness. Higher exposures may lead to rapid respiration, lowered blood pressure, unconsciousness, convulsions and eventual death. Evidence suggests that there is significant permeation through the skin and that individuals with a preexisting disease of the central nervous system may have increased susceptibility to more toxic effects of overexposure.

Chronic Health Effects:
Chronic exposure to cyanide are non-specific and rare.

Routes Of Entry:
May be fatal if inhaled, absorbed through the skin or swallowed. Contact with acid rapidly liberates dangerous amounts of HCN gas. Contact with water or weak alkali solutions can liberate smaller but still dangerous amounts of HCN gas. Can cause severe burns to the eye and irritation to the skin areas.
Move the affected person from the hazardous exposure area. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's rescue procedures and know the location of rescue equipment before the need arises. The following toxicity data are the "Reported (Estimated) Human Response to Various Concentrations of HCN Vapors" according to a NIOSH criteria data document. 300ppm...Rapidly fatal, 100-200ppm...fatal within .5-1 hr, 45-54ppm...tolerated for .5-1 hr. without immediate or delayed effects, 20-40ppm...slight symptoms after several hours, 10ppm...TLV/TWA for a normal 8 hr. day, no adverse effect. 2-5ppm...odor threshold.

Medical Conditions Aggravated By Exposure:
Inhalation or ingestion of cyanide salts or solutions may be rapidly fatal. Larger doses by inhalation or swallowing may cause the victim to rapidly lose consciousness, stop breathing, and expire. In some cases there are convulsions. At low levels of exposure, the earlier symptoms include weakness, headache, confusion, nausea, and vomiting.

Emergency And First Aid Procedures:
Treatment for cyanide poisoning can be provided in two ways, "First Aid" and "Medical Treatment". Both require immediate action to prevent further harm or death. First aid using amyl nitrite and oxygen is generally given by a person qualified to administer first aid before medical help arrives. Medical treatment involves intravenous injections and must be administered by qualified medical personnel. Experience has shown that if first aid is given promptly this is the only treatment needed.
Medical treatment is given if the victim does not respond to first aid. It provides a larger quantity of antidote including sodium thiosulfate to chemically destroy cyanide in the body. Amyl nitrite and medical treatment kits for cyanide poisoning can be obtained from a laboratory supply facility dealing with safety supplies.
CONSCIOUS: for inhalation and/or absorption if the victim is alert, oxygen may be all that is needed. If the victim is not fully conscious or shows signs of poisoning, then continue the following instructions.
UNCONSCIOUS AND BREATHING: Break an amyl nitrite ampoule in a cloth and hold under the victim's nose for 15 seconds. Remove for 15 seconds and then repeat procedure 5-6 times. If necessary, use a fresh ampoule every 3 minutes until the victim regains consciousness (usually 1-4 ampoules). Give oxygen to aid recovery. Where more severe poisoning has occurred, consider holding the amyl nitrite under the nose continuously for the first ampoule or more.

NOT BREATHING: Give artificial respiration, preferably with an oxygen resuscitator. Give amyl nitrite by placing the broken ampoule in the face piece of the resuscitator, being careful not to allow the ampoule to enter the victim's mouth. If using manual artificial respiration, give the amyl nitrite antidote as in the previous paragraphs except keep the ampoule under the nose with replacement every 3 minutes.
MEDICAL TREATMENT: Medical treatment is normally provided by a physician, but i extreme cases might be provided by a professionally trained "qualified medical person" where a need exists and where state and local laws permit.
Sodium nitrite and sodium thiosulfate are given intravenously. If the victim is not responding to amyl nitrite, a solution of sodium nitrite (10 ml of a 3% sol ution) is given intravenously at the rate of 2.5 ml/minute, then immediately inject the thiosulfate (50 ml of a 25% solution) at the same rate, taking care to avoid extravasation. This is a fairly lengthy treatment (approx. 25-30 min.) Consideration must be given to the weight and condition of the patient. The sodium nitrite is about one third of a lethal dose, so care should be taken to avoid excessive use. It is not essential that the full quantities be given; injections can be stopped at any point if recovery is evident. The patient must be carefully watched for a 24-48 hour period if the cyanide exposure was severe Further treatment can be administered, but only by a qualified physician, and that is if the patient has developed methemoglobinemia (blue skin).

Section 04 : Chemical Data

Boiling Point:	N/A
Vapor Pressure:	N/A
Vapor Density:	N/A
Specific Gravity:	2.36
Per Cent Volatile By Volume:	N/A
Evaporation Rate Based On:	N/A
Evaporation Rate:	N/A

Solubility (Specify Solvents):
25% soluble in water @ 20C. The cyanide salt dissolved in water forms an equi- librium between ionized cyanide and highly volatile hydrogen cyanide; although in very small quantity, extreme care should be taken when dissolving the salt.

Appearance & Odor:
White crystalline material, with no discernible odor. The material is extremely sensitive to light. It will darken if exposed to strong light source.

Section 05 : Physical Hazard Data

Flash Point:	N/A
Flammable Limits:	Non-flammable
Lel:	N/A
Jel:	N/A

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Flammability Data:
The material will not burn. The cyanide salt or solution will not be destroyed in an ordinary fire involving combustible materials such as wood or paper. The compound would require a very hot fire in order to decompose.

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Extinguishing Media:
DO NOT use carbon dioxide which can react with the cyanide in the presence of moisture to form hydrogen cyanide which is very flammable. Water would be best used to extinguish the fire.

Usual Fire Fighting Procedures:
Firefighters should wear proper protective equipment and self-contained breathing appartus with full facepiece in the positive pressure mode. The cyanide material can pose a threat to the environment during a fire in that hosing down the fire with water can dissolve the cyanide and wash it to the environment, causing undo contamination. The runoff should try to be contained and then detoxified with hypochlorite solution.

Unusual Fire Fighting Procedures:
Closed containers of cyanides exposed to the heat of fire may explode. The closed containers can be hosed down with water to keep them cool. Toxic HCN gases can be released in an intense fire.

Incompatibility:
Contact with acid solutions forms highly toxic and flammable hydrogen cyanide. Will react violently with strong oxidizing agents, i.e.,nitrates, permanganates

Hazardous Decomposition Products:
Containers should be securely closed as moisture will cause slow decompositon and the formation of toxic HCN and ammonia gases.

Hazardous Polymerization:
Will not occur.

Stability:
This material is stable

Section 06 : Spill Or Leak Procedures

Steps To Be Taken In Case Material Is Released Or Spilled:
Soak up the spill or powder with an inert material and return to the recycling facility for the recovery of the precious metal material. This material cannot be washed to any sewer or drain.

Waste Disposal Method:
Must be disposed of in accordance with all Federal, State, and local regulations. Do not flush cyanide to any sewer or drain that may contain acid disposal as this will cause the evolution of hydrocyanic gas which is extremely poisonous and toxic; also, this substance is highly toxic to marine life. Comply with all regulatory agencies in the event of a major release to the environment. Flush spill area with a dilute solution of sodium or calcium hypochlorite and remove to a waste treatment system for further disposal. Under Federal and State Regulations, cyanide bearing precious metal materials are now considered hazardous waste and therefore, must be manifested to a permitted recycling facility for reclamation.

Section 07 : Exposure Control Information

Respiratory Protection:
Do not breath dust or gas. Wear an approved dust respirator when there is dange of inhaling cyanide dust. The respirator should be one approved by the Mining Enforcement and Safety Administration or by NIOSH. Minimum respiratory protection is required for levels of cyanide above 5 mg/m3. For greater than 50 mg/m3 a self-contained breathing apparatus with a full facepiece operated in the pressure demand or other positive pressure mode. A combination respirator which includes a Type C supplied air respirator with a full facepiece operated in pressure demand or other positive pressure or continuous flow mode and an auxiliary self-contained breathing apparatus, also in the same modes. For any emergency escape, any gas mask providing protection against hydrogen cyanide an particulates can be worn.

Ventilation - Local Exhaust:
Local exhaust ventilation to keep dust, mist and HCN gas below exposure limits.

Ventilation - Special:
General dilution ventilation control could be an added safeguard in the area of cyanide operation.

Ventilation - Mechanical:
N/A

Ventilation - Other:
N/A

Protective Gloves:
Employees should be provided with and required to wear impervious gloves to prevent any possibility of skin contact with the chemical substance.

Eye Protection:
The individual or employee must wear approved chemical splash goggles and/or face shield to avoid eye contamination.

Other Protective Equipment:
Employees should be provided with and required to use impervious clothing to prevent any possibility of skin contact with this hazardous substance.

Work Practices:
Skin that becomes contaminated with this substance should be immediately washed or showered with soap.

Hygienic Practices:
Eating and smoking should not be permitted in areas where these hazardous substances are handled, processed, or stored. Employees who handle these materials should wash their hands thoroughly with soap and water before eating, smoking, or using the toilet facilities. OSHA cautions that since this substance may penetrate the skin, especially if broken, control of the vapor or dust inhalation may not be sufficient to prevent absorption of an excessive dose and therefore recommends proper hygienic practices at all times.

Section 08 : Special Precautions

Precautions To Be Taken In Handling & Storage:
Store in a dry, well ventilated area away from food stores or beverages.

Other Precautions:
Containers should be kept closed when not in use to avoid the absorption of moisture. Do not store with other chemicals that are incompatible.

Section 09 : Special Health Precautions

Special Health Precautions:
Although some of the heavy metals that may be present in this product are liste as EP toxic under Federal Regulations, they are relevant only under effluent guidelines pertaining to the Clean Water Act, and RCRA, for waste disposal; therefore, the hazardous quality of the cyanide herein precedes all hazardous conditions of this product.
All information, recommendations and suggestions appearing herein concerning ou product are based upon data believed to be reliable, however, it is the user's responsibility to determine the safe handling and suitability for his or her ow use of the product described herein. Since the actual use by others is beyond our control, no guarantee, expressed or implied, is made by American Chemical & Refining Company, Inc. as to the effects of such use, the results obtained, or the safety and toxicity of the product nor does the Company per se assume any liability arising out of use, by others, of the product referred to herein. Nor is the information herein to be construed as absolutely complete since more information may be desirable or necessary when particular or exceptional conditions or circumstances exist, or because of applicable laws or government regulations.

PREPARED/REVISED BY: KALMAN Le BOW
TITLE: COORDINATOR of ENVIRONMENTAL REGULATIONS

Section 10 : Transportation

As mentioned in Section 06 :(SEE DISPOSAL METHOD), this substance is now a hazardous waste and must be treated accordingly. When the substance is to be sent to a Designated Facility for reclaim, it must be manifested and have the proper shipping name and labels on the drum, according to EPA and DOT regs.
PROPER SHIPPING NAME: RQ Waste Silver Cyanide (Solution)
HAZARD CLASS: Poison B
ID.#: UN 1684, Poison label (skull & crossbone)
A hazardous waste label must be included on the drum. All information is to be shown on the side of the drum, not on the top. All information is to be printed or typed. The Hazard Class,(Poison B) is not to be put on the drum.The Poison label satisfies this requirement. RQ, means Reportable Quantity, this satisfies the new regs for CERCLA.

PMC 1530

Update as of, March 30, 1984

PMC 1530

RECEIVED OCT 28 1985 INDUSTRIAL HYGIENE

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
American Chemical & Refining Company, Inc.	(203)-757-9231
ADDRESS (Number, Street, City, State, and ZIP Code) 36 Sheffield Street, Waterbury, Connecticut 06720	
CHEMICAL NAME AND SYNONYMS Potassium Dicyanoargentate (1)	TRADE NAME AND SYNONYMS Potassium Silver Cyanide
CHEMICAL FAMILY Metallic Cyanide	FORMULA KAg (CN)$_2$

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS None			BASE METAL None		
CATALYST None			ALLOYS None		
VEHICLE None			METALLIC COATINGS None		
SOLVENTS None			FILLER METAL PLUS COATING OR CORE FLUX None		
ADDITIVES None			OTHERS None		
OTHERS None					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
NA		
CAS #506-61-6 Potassium Silver Cyanide		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	NA	SPECIFIC GRAVITY (H_2O=1)	2.36
VAPOR PRESSURE (mm Hg.)	NA	PERCENT, VOLATILE BY VOLUME (%)	NA
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____ =1)	NA
SOLUBILITY IN WATER	25% @ 20° C		
APPEARANCE AND ODOR	White crystalline material - no odor, sensitive to light.		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None	NA		

EXTINGUISHING MEDIA
Non-flammable; however, if in the vicinity of a fire do not hose down with water

SPECIAL FIRE FIGHTING PROCEDURES
as the cyanide will go into solution and pose a threat to the environment or mix with acidic chemicals & form hydrocyanic gas which is extremely toxic & hazardous.

UNUSUAL FIRE AND EXPLOSION HAZARDS
CO_2 or foam would be less hazardous to use.

(Continued on reverse side)

PMC 1530

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
5 mg/M as cyanide

EFFECTS OF OVEREXPOSURE
Weakness, dizziness, headache, nausea, vomiting and eventual unconsciousness

EMERGENCY AND FIRST AID PROCEDURES
Flush skin & eyes with large amounts of water, remove contaminated clothing immediately. If hydrocyanic gas is evolved, remove patient to fresh air, and if need be, give O2. If unconscious give artificial respiration and call a physician at once. Do not give anything orally to an unconscious person.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*
Do not add acid or acid salts to the cyanide or strong oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS
Hydrocyanic gas under acidic conditions.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Soak up spill with an inert material and return to refinery for recovery of silv

Material should not be washed into any sewer or drain.

WASTE DISPOSAL METHOD
Dispose of in accordance with State & Federal Regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
A self-contained breathing apparatus if HCN gas is present. Dry chemical, a dust

VENTILATION	LOCAL EXHAUST: Adequate exhaust	SPECIAL: mist canister type
	MECHANICAL *(General)*: Use in well ventilated area.	OTHER

PROTECTIVE GLOVES: Impervious rubber or other imprevious material.
EYE PROTECTION: Chemical safety goggles

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Adequate body protection

OTHER PRECAUTIONS
Store away from food - wash hands after using.

PMC 1530

Consumer Product Testing

Supplier
Philipp Brothers Chemical
Newfield St.
Middletown, Conn.

Bldg. No. 2-168
1275 Bloomfield Avenue
Fairfield, New Jersey 07006

Company Incorporated
(201) 575-7688
(201) 575-7689

RECEIVED
SEP 18 1981

LTC IN LAO

MATERIAL SAFETY DATA SHEET

PREPARED FOR:

ENGELHARD

Engelhard Industries Division G. E. PARSONS
Engelhard Minerals & Chemicals Corporation
70 Wood Avenue South
Iselin, New Jersey 07730

Department Name: Silver Salts and Powders | Department Number: 031 | 10/80

Required under USDL Safety and Health Regulations

SECTION I — SOURCE AND NOMENCLATURE

Product Name and Synonyms: Potassium Silver Cyanide	Trade Name and Synonyms: ---
Chemical Family: ---	Formula: $KAg(CN)_2$
Manufacturer's Name: Engelhard Minerals and Chemicals Corporation	Emergency Telephone No.: 201-575-7688 (7689)
Address (Number, Street, City, State, Zip Code): 70 Wood Avenue South, Iselin, New Jersey 07730	

SECTION II — HAZARDOUS INGREDIENTS

Hazardous Materials or Components	%	TLV (Units)
Base Metal	54.2	0.01/Mg/M^3

SECTION III — PHYSICAL DATA

Boiling Point (°F.) --- (°C)	Percent, Volatile By Volume (%) NA
Vapor Pressure (mmHg.) at 20° C ---	Appearance and Odor: White crystalline powder. Cyanide odor
Vapor Density (Air = 1) ---	Freezing Point (°F) --- (°C)
Solubility in water wt. at 20°C: Soluble	Evaporation Rate (=1) NA
Specific Gravity (H_2O =1) ---	

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method Used): NA.	Flammable (Explosion) Limits in Air % by volume	Upper	NA
		Lower	NA

Extinguishing Media: Water may be used on fires near Potassium Silver Cyanide.

Specific Fire Fighting Procedures: Firefighters must use recommended protective equipment.

Self-contained breathing apparatus must be used.

Unusual Fire and Explosion Hazards: Cyanogen, Hydrogen Cyanide

PMC 1530

SECTION V — HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: Soluble Silver Compounds 0.01 Mg/M^3

EFFECTS OF OVEREXPOSURE: ROUTES OF EXPOSURE: Eye, skin and respiratory tract.

SYMPTOMS: May produce cyanide rash. Systemic absorption causes respiratory depression & cyanc

ORAL TOXICITY: Highly toxic. LD_{50} (Rat) < 50 mg/kg (no survivors)

INHALATION TOXICITY: Do not breath vapors. Respiratory depression and cyanosis may occur.

DERMAL TOXICITY: Moderately toxic. LD_{50} (Rabbit) > 200 mg/kg (no deaths); may cause cyanide rash

SKIN IRRITATION: See Dermal Toxicity.

EYE IRRITATION: Corrosive Material is very toxic when absorbed through the eye.

SECTION VI — REACTIVITY DATA

Stability	Unstable		Conditions to Avoid: Exposure to light, overheating
	Stable	X	

Incompatibility (Materials to Avoid): Acids react to release hydrogen cyanide gas.

Hazardous Decomposition Products: Hydrogen cyanide

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	---
Corrosion	Aluminum	---	
	Steel	---	

Determined in accordance with requirement no. _____, by procedure no. _____

Determined in accordance with requirement no. _____, by procedure no. _____

SECTION VII — SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled: Evacuate area. Use protective clothing during clean up. Flush area with large amounts of water. Contain waste water.

Waste Disposal Method: Dispose of in approved hazardous waste disposal facility.

SECTION VIII — SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify type): Self-contained breathing apparatus.

Ventilation	Local Exhaust	X	Special	---
	Mechanical (General)	X	Other	---

Protection Gloves: Impervious gloves should be worn.

Eye Protection: Chemical type goggles should be worn.

Other Protective Equipment: Normal industrial protective clothing and shoes must be worn.

SECTION IX — SPECIAL PRECAUTIONS

Precautionary Labeling: Class B poison.

Precautions to be taken in handling and storing: Avoid exposure to light. Industrial precautionary label required. Protect against physical damage. Do not store near acids.

Other Precautions: Avoid contact with acids, which releases hydrogen cyanide. Avoid overheating.

SECTION X — EMERGENCY AND FIRST AID PROCEDURES

Eye Contact	Flush thoroughly with water for at least 15 minutes. Get immediate medic attention. Highly toxic when absorbed into the eye.
Skin Contact	Remove contaminated clothing. Wash contact areas with soap and water. Wash clothing before reuse.
Inhalation	Exposure to hydrogen cyanide causes irritation, respiratory depression and cyanosis. Use amyl nitrite under the nose. Call a physician if unconscious.
Ingestion	Induce vomiting immediately by giving two glasses of water. Call a physician Never give anything by mouth to an unconscious person

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JUL 27 1988

INDUSTRIAL HYG

ENTHONE
INCORPORATED

MATERIAL SAFETY DATA SHEET

ENSTRIP® S

P.O. BOX 1900
NEW HAVEN, CT 06508

EMERGENCY PHONE NUMBERS				
PLANTS	203-934-8611	(8:30am-5pm	EST)	PRODUCT CODE#: 2501
	312-598-3210	(8:30am-5pm	CST)	DATE ISSUED: 7/24/87
MFSA	313-644-5626	(24 hours)		SUPERCEDES: 8/78
CHEMTREC	800-424-9300	(Transportation)		PREPARER: F.R. Hirtler FRH

II. HAZARDOUS INGREDIENTS

COMPONENT	COMMON NAME	CAS NO.	OSHA-PEL	ACGIH-TLV	%
Sodium m-Nitrobenzenesulfonate		127-68-4	NI	NI	100

III. PHYSICAL PROPERTIES

SPECIFIC GRAVITY (WATER =1)	NI	BOILING POINT, °F	NA
EVAP.RATE (BUTYL ACETATE=1)	NA	MELTING POINT, °F	NI
VAPOR PRESSURE, mmHg	NA	SOLUBILITY IN WATER	essentially complete
VAPOR DENSITY (AIR=1)	NA	APPEARANCE	off-white powder
pH (AS IS)	NA	ODOR	slightly aromatic

IV. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT, °F	None	FLAMMABLE LIMITS (AIR)	NA	LEL	NA	UEL

EXTINGUISHING MEDIA

[ ] Not Combustible [X] Water fog or spray [X] Carbon Dioxide [ ] Dry Chemical [ ] Alcohol Foam [X] Foam [ ] Sand or Earth

SPECIAL FIRE FIGHTING PROCEDURES

Wear self-contained breathing apparatus (SCBA) and complete personal protective equipment when potential for exposure to vapors or products of combustion exists.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Product will self-sustain combustion when ignited.

V. HEALTH HAZARD DATA

EFFECTS OF ACUTE EXPOSURE:

INHALATION: Can cause irritation.

INGESTION: Can cause irritation to mouth, throat, esophagus, and stomach.

SKIN: Can cause irritation.

EYES: Can cause severe irritation.

EFFECTS OF CHRONIC EXPOSURE:

None known.

CARCINOGEN: Not listed by NTP, IARC, OSHA

REFERENCE:

EMERGENCY AND FIRST AID PROCEDURES

INHALATION: Remove person from contaminated area. If breathing has stopped, resuscitate and administer oxygen if available.
Seek immediate medical attention.

INGESTION: Never give anything by mouth to an unconscious person, obtain immediate medical attention. If vomiting occurs spontaneously, keep airway clear. If swallowed DO NOT INDUCE VOMITING, give large amounts of water.
Seek immediate medical attention.

SKIN: Immediately wash contaminated skin with plenty of water for 15 minutes. Remove contaminated clothing and footwear. Wash clothing before reuse. Discard footwear if it cannot be decontaminated.
Seek immediate medical attention.

EYES: Flush eyes with plenty of water, holding lids apart to ensure flushing of entire surface to prevent or relieve irritation.
If irritation persists, seek medical attention.

VI. PRECAUTIONS FOR SAFE HANDLING AND USE

SPILL PROCEDURES:

Avoid contact with skin, eyes, and clothing. Wear protective equipment (See section VII). Sweep or shovel spilled material into clean plastic lined container and cover. Flush spill area with copious amounts of water. Dispose of in accordance with Local, State and Federal regulations.

STORAGE AND HANDLING PRECAUTIONS:

Store in a cool, dry place. Keep away from acids and oxidizers. Loosen cover cautiously when opening.

ADDITIONAL INFORMATION:

Wash thoroughly after handling.

VII. CONTROL MEASURES

VENTILATION: Local exhaust recommended.

RESPIRATOR: Use NIOSH approved respirator when air concentration is greater than the TLV or PEL. Use cartridge filter for dusts.

EYE PROTECTION: [ ] Safety glasses [X] Chemical safety goggles [ ] Face shield

PROTECTIVE GLOVES: [X] Neoprene [X] Natural rubber Other:

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

Chemically resistant coveralls, hat, and shoes or boots.

WORK/HYGENIC PRACTICES:

Emergency eye wash and safety shower should be available. Wash thoroughly after handling.

ADDITIONAL INFORMATION:

For waste disposal of operating solutions consult Enthone Waste Disposal Procedures. For major spills consult Enthone for disposal assistance. Dispose of in accordance with Local, State, and Federal regulations.

CAS = Chemical Abstract Service
NI = No relevant information available
NA = Not applicable
Trade Secret = Claimed as allowed under 29 CFR 1910.1200

PEL = OSHA Permissible Exposure Limit
TLV = ACGIH Threshold Limit Value
NTP = National Toxicology Program
IARC = Int'l Agency for Research on Cancer

VIII. REACTIVITY DATA

X	Stable	CONDITIONS TO AVOID:	Stable under normal conditions. See Incompatibility information.
	Unstable		

INCOMPATABILITY (Materials to avoid): Oxidizing agents, acids, acid salts.

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic oxides of nitrogen, sulfur and carbon.

HAZARDOUS POLYMERIZATION		May occur	CONDITIONS TO AVOID: NA
	X	Will not occur	

IX. ADDITIONAL INFORMATION

PMC 1531

PMC 1537

MATERIAL SAFETY DATA SHEET

(R) 5/23/88

CODE 13501

SECTION 1

Manufacturer's Name MacDermid Incorporated	**EMERGENCY TELEPHONE** 203-575-5700
ADDRESS (Number, Street, City, State, Zip Code) 526 Huntingdon Avenue Waterbury, CT. 06708	**MFSA EMERGENCY 24 HOUR HOTLINE: (Medical)** (313) - 644 - 5626
CFR-49 - DOT Proper Shipping Name Non regulated	
CHEMICAL NAME AND SYNONYMS N/A	**TRADE NAME AND SYNOMYMS** Metex Strip Aid
CHEMICAL FAMILY Organic Salt	**FORMULA** Mixture

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVE & SOLVENTS	%	TLV (UNITS)	ALLOYS & METALLIC COATINGS	%	TLV (UNITS)
	N/A			N/A	
PIGMENTS	"		BASE METAL	"	
CATALYST	"		ALLOYS	"	
VEHICLE	"		METALLIC COATINGS	"	
SOLVENTS	"		FILLER METAL PLUS OR CORE FLUX	"	
ADDITIVES	"		OTHERS	"	
OTHERS	"				

HAZARDOUS MIXTURES OR OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (UNITS)
Salt of sulfonic acid (27215-71-0)	100	Not listed

SECTION III - PHYSICAL DATA

BOILING POINT (F)	N/A	**SPECIFIC GRAVITY (H_2O = 1)**	N/A
VAPOR PRESSURE (MM. HG.)	0	**PERCENT VOLATILE BY VOLUME (%)**	0
VAPOR DENSITY (AIR = 1)	N/A	**EVAPORATION RATE (= 1)**	N/A
SOLUBILITY IN WATER	Appreciable		

APPEARANCE AND ODOR

Pale yellow to tan powder - odorless

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) Non-flammable	**FLAMMABLE LIMITS** N/A	~~LEL~~	~~UEL~~
EXTINGUISHING MEDIA Waterspray, CO_2, alcohol, foam, dry chemical			
SPECIAL FIRE FIGHTING PROCEDURES If material is smoldering, spread burning material out thinly and douse with water. Wear self-contained breathing apparatus.			
UNUSUAL FIRE AND EXPLOSION HAZARDS Material is an oxygen donor and can support combustion.			

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

Not established for product.

EFFECTS OF OVEREXPOSURE-UNLESS OTHERWISE STATED, CHRONIC OR LONG-TERM HEALTH EFFECTS UNKNOWN

Possible slight irritation to eyes, skin and mucous membranes.

EMERGENCY AND FIRST AID PROCEDURES

EYES: Flush with water for 15 minutes. Contact physician.
SKIN: Flush with water.
INTERNAL: Give water. Do not induce vomiting. Contact physician.
INHALATION: Remove to fresh air.

SECTION VI - REACTIVITY DATA

UNSTABLE		**CONDITIONS TO AVOID**
STABLE	X	N/A

INCOMPATIBILITY (MATERIALS TO AVOID)

Strong oxidizers, sources of ignition.

HAZARDOUS DECOMPOSITION PRODUCTS

Oxides of sulfur/nitrogen

HAZARDOUS POLYMERIZATION		**CONDITIONS TO AVOID**
MAY OCCUR		N/A
WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED - WEAR PROTECTIVE CLOTHING. NEV
DISCHARGE DIRECTLY INTO SEWERS OR WATERWAYS

Scoop up with steel shovel. Flush remaining material to chemical drain with water.

WASTE DISPOSAL METHOD - ALWAYS CHECK AND COMPLY WITH GOVERNMENT DISPOSAL REGULATIONS

Dissolve in water, flush to drain. Check government disposal regulations.
Alternate Method: Incineration when allowed by government regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)

Not normally required

VENTILATION	**LOCAL EXHAUST** N/A	**SPECIAL** N/A
	MECHANICAL (GENERAL) X	**OTHER** N/A

PROTECTIVE GLOVES Rubber	**EYE PROTECTION** Safety goggles

OTHER PROTECTIVE EQUIPMENT

Protective clothing

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Store in cool, dry area away from open flame, sparks and other sources of ignition.

OTHER PRECAUTIONS - AVOID EYE AND SKIN CONTACT. ALWAYS WASH CLOTHING BEFORE RE-USE

Wash thoroughly after handling.

PREPARED BY: MacDermid Incorporated **DATE:** 5/23/88

13501

SAFETY & WARNING INFORMATION

MATERIAL SAFETY DATA SHEET

PMC 1531

(R) 9/18/87

CODE 13501

SECTION I

Manufacturer's Name MacDermid Incorporated RECEIVED	EMERGENCY TELEPHONE 203-575-5700
ADDRESS (Number, Street, City, State, Zip Code) 526 Huntingdon Avenue Waterbury, CT. 06708 MAY 4 1988	MFSA EMERGENCY 24 HOU HOTLINE: (Medical) (313) - 644 - 5626
CFR-49 - DOT Proper Shipping Name Non Hazardous INDUSTRIAL HYGIENE	
CHEMICAL NAME AND SYNONYMS N/A	TRADE NAME AND SYNONY Metex Strip Aid
CHEMICAL FAMILY Salt of Sulfonic Acid	FORMULA Mixture

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVE & SOLVENTS	%	TLV (UNITS)	ALLOYS & METALLIC COATINGS	%	TLV (UNITS
	N/A			N/A	
PIGMENTS	"		BASE METAL	"	
CATALYST	"		ALLOYS	"	
VEHICLE	"		METALLIC COATINGS	"	
SOLVENTS	"		FILLER METAL PLUS OR CORE FLUX	"	
ADDITIVES	"		OTHERS	"	
OTHERS	"				

HAZARDOUS MIXTURES OR OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (UNITS
Salt of sulfonic acid (27215-71-0)	100	Not listed

SECTION III - PHYSICAL DATA

BOILING POINT (F)	N/A	SPECIFIC GRAVITY (H_2O = 1)	N/
VAPOR PRESSURE (MM. HG.)	0	PERCENT VOLATILE BY VOLUME (%)	0
VAPOR DENSITY (AIR = 1)	N/A	EVAPORATION RATE (= 1)	N/
SOLUBILITY IN WATER	Appreciable		

APPEARANCE AND ODOR
Pale yellow to tan powder - odorless

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) Non-flammable	FLAMMABLE LIMITS N/A	LEL	UE

EXTINGUISHING MEDIA
Waterspray, CO_2, alcohol, foam, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES
If material is smoldering, spread burning material out thinly and douse with water. Wear self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Material is an oxygen donor and can support combustion.

PMC 1531

SAFETY & WARNING INFORMATION

PMC 1531

Industrial Hygiene – General Requirements

(To be attached to every MacDermid Material Safety Data Sheet.)

INGESTION
All food should be kept in a separate area away from the working location. Eating, drinking, smoking and carrying of tobacco products should be prohibited in areas where there is a potential for significant exposure to this material. Before eating, drinking or smoking, hands and face should be thoroughly washed.

SKIN CONTACT
Skin contact should be prevented through the use of impervious clothing, gloves and footwear. A face shield should be worn when use conditions could result in exposure to the material.

EYE CONTACT
Eye contact should be prevented through the use of chemical safety glasses, goggles or face shield.

INHALATION
This material should only be handled in open or well-ventilated areas. Where adequate ventilation is not available and there is possibility of vapor, aerosol or mist generation, control of inhalation can be achieved through the use of a NIOSH-approved, half-face-piece cartridge, air-purifying respirator.

General Storage Requirements for Hazardous Materials

CORROSIVE MATERIALS
Corrosive materials must not be above, below or adjacent to: Flammable Solids, Oxidizing Materials, Cyanide Bearing Materials (Poison).

FLAMMABLE LIQUIDS
Keep Flammable Liquids in a segregated area, preferably outside of your facility or in a Flammable Liquid storage cabinet.

DOUBLE LABELED MATERIALS
(Example: Corrosive Liquid; Poisonous NOS). Primary hazard is Corrosive; secondary hazard is Poison. Consider both hazards in storing the material. In this example, do not store near Flammable Solids, Oxidizing or Cyanide Bearing materials because of the corrosive element. Preferably keep double labeled materials separate from all other diamond labeled materials.

ACIDS/ALKALINES
Acid bearing material should be stored separate from Alkaline bearing material.

MacDermid INCORPORATED
(203) 575-5700

+ EMERGENCY DIRECTORY ASSISTANCE
(313) 644-5626

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MATERIAL SAFETY DATA SHEET

PMC 1557

R) 9/18/87

INDUSTRIAL HYGIENE

CODE 13501

SECTION 1

Manufacturer's Name MacDermid Incorporated	**EMERGENCY TELEPHONE** 203-575-5700
ADDRESS (Number, Street, City, State, Zip Code) 526 Huntingdon Avenue Waterbury, CT. 06708	**MFSA EMERGENCY 24 HOUR HOTLINE: (Medical)** (313) - 644 - 5626
CFR-49 - DOT Proper Shipping Name Non Hazardous	
CHEMICAL NAME AND SYNONYMS N/A	**TRADE NAME AND SYNOMYMS** Metex Strip Aid
CHEMICAL FAMILY Salt of Sulfonic Acid	**FORMULA** Mixture

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVE & SOLVENTS	%	TLV (UNITS)	ALLOYS & METALLIC COATINGS	%	TLV (UNITS)
	N/A			N/A	
PIGMENTS	"		BASE METAL	"	
CATALYST	"		ALLOYS	"	
VEHICLE	"		METALLIC COATINGS	"	
SOLVENTS	"		FILLER METAL PLUS OR CORE FLUX	"	
ADDITIVES	"		OTHERS	"	
OTHERS	"				

HAZARDOUS MIXTURES OR OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (UNITS)
Salt of sulfonic acid (27215-71-0)	100	Not listed

SECTION III - PHYSICAL DATA

BOILING POINT (F)	N/A	**SPECIFIC GRAVITY (H_2O = 1)**	N/A
VAPOR PRESSURE (MM. HG.)	0	**PERCENT VOLATILE BY VOLUME (%)**	0
VAPOR DENSITY (AIR = 1)	N/A	**EVAPORATION RATE (= 1)**	N/A
SOLUBILITY IN WATER	Appreciable		

APPEARANCE AND ODOR
Pale yellow to tan powder - odorless

SECTION IV = FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) Non-flammable	**FLAMMABLE LIMITS** N/A	~~LEL~~	~~UEL~~
EXTINGUISHING MEDIA Waterspray, CO_2, alcohol, foam, dry chemical			
SPECIAL FIRE FIGHTING PROCEDURES If material is smoldering, spread burning material out thinly and douse with water. Wear self-contained breathing apparatus.			
UNUSUAL FIRE AND EXPLOSION HAZARDS Material is an oxygen donor and can support combustion.			

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

Not established for product.

EFFECTS OF OVEREXPOSURE-UNLESS OTHERWISE STATED, CHRONIC OR LONG-TERM HEALTH EFFECTS UNKNOWN!

Possible slight irritation to eyes, skin and mucous membranes.

EMERGENCY AND FIRST AID PROCEDURES

EYES: Flush with water for 15 minutes. Contact physician.
SKIN: Flush with water.
INTERNAL: Give water. Do not induce vomiting. Contact physician.
INHALATION: Remove to fresh air.

SECTION VI - REACTIVITY DATA

UNSTABLE		**CONDITIONS TO AVOID**
STABLE	X	N/A

INCOMPATIBILITY (MATERIALS TO AVOID)

Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS

Oxides of sulfur, carbon and nitrogen, oxygen gas

HAZARDOUS POLYMERIZATION		**CONDITIONS TO AVOID**
MAY OCCUR		N/A
WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED - WEAR PROTECTIVE CLOTHING. NEVER DISCHARGE DIRECTLY INTO SEWERS OR WATERWAYS

Scoop up with steel shovel. Flush remaining material to chemical drain with water.

WASTE DISPOSAL METHOD - ALWAYS CHECK AND COMPLY WITH GOVERNMENT DISPOSAL REGULATIONS

Flush to chemical drain. Check government disposal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)

Not normally required

VENTILATION	**LOCAL EXHAUST**	**SPECIAL**
	N/A	N/A
	MECHANICAL (GENERAL)	**OTHER**
	X	N/A

PROTECTIVE GLOVES	**EYE PROTECTION**
Rubber	Safety goggles

OTHER PROTECTIVE EQUIPMENT

Protective clothing

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Store in cool, dry area away from open flame, sparks and other sources of ignition.

OTHER PRECAUTIONS - AVOID EYE AND SKIN CONTACT. ALWAYS WASH CLOTHING BEFORE RE-USE

Wash thoroughly after handling.

PREPARED BY: MacDermid Incorporated **DATE:** 9/18/87

13501

SAFETY & WARNING INFORMATION

Industrial Hygiene – General Requirements

(To be attached to every MacDermid Material Safety Data Sheet.)

INGESTION
All food should be kept in a separate area away from the working location. Eating, drinking, smoking and carrying of tobacco products should be prohibited in areas where there is a potential for significant exposure to this material. Before eating, drinking or smoking, hands and face should be thoroughly washed.

SKIN CONTACT
Skin contact should be prevented through the use of impervious clothing, gloves and footwear. A face shield should be worn when use conditions could result in exposure to the material.

EYE CONTACT
Eye contact should be prevented through the use of chemical safety glasses, goggles or face shield.

INHALATION
This material should only be handled in open or well-ventilated areas. Where adequate ventilation is not available and there is possibility of vapor, aerosol or mist generation, control of inhalation can be achieved through the use of a NIOSH-approved, half-face-piece cartridge, air-purifying respirator.

General Storage Requirements for Hazardous Materials

CORROSIVE MATERIALS
Corrosive materials must not be above, below or adjacent to: Flammable Solids, Oxidizing Materials, Cyanide Bearing Materials (Poison).

FLAMMABLE LIQUIDS
Keep Flammable Liquids in a segregated area, preferably outside of your facility or in a Flammable Liquid storage cabinet.

DOUBLE LABELED MATERIALS
(Example: Corrosive Liquid, Poisonous NOS). Primary hazard is Corrosive, secondary hazard is Poison. Consider both hazards in storing the material. In this example, do not store near Flammable Solids, Oxidizing or Cyanide Bearing materials because of the corrosive element. Preferably keep double labeled materials separate from all other diamond labeled materials.

ACIDS/ALKALINES
Acid bearing material should be stored separate from Alkaline bearing material.

MacDermid
(203) 575-5700

EMERGENCY DIRECTORY ASSISTANCE
(313) 644-5626

mfsa

UTC IH LAB.

PMC 1531

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

RECEIVED
MAR 24 1981

Previous info 3/27/69 G. E. PARSONS

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Enthone, Inc. J.A. Zehnder	203-934-8611

ADDRESS (Number, Street, City, State, and ZIP Code)
Box 1900 New Haven, Conn. - 06508

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
N.A.	Enstrip S
CHEMICAL FAMILY	**FORMULA**
N.A.	N.A.

MAY 18 '82

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
No known hazardous ingredients		

1746

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	-	SPECIFIC GRAVITY (H_2O=1)	-
VAPOR PRESSURE (mm Hg.)	-	PERCENT, VOLATILE BY VOLUME (%)	-
VAPOR DENSITY (AIR=1)	-	EVAPORATION RATE (_____ =1)	-
SOLUBILITY IN WATER	Soluble		

APPEARANCE AND ODOR Off-white powder with slight aromatic odor.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	LEL	UEL
None	Auto ignition point		
EXTINGUISHING MEDIA in a fire - CO_2, Foam.	of 645°F		

SPECIAL FIRE FIGHTING PROCEDURES If water is used, copious flooding is necessary to avoid spreading of fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS May ignite upon heating. Dust explosion and/or fire possible if exposed to spark. Explosibility of dust = 0.2 oz/ft^3 at max. of 80 psig.

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: N.A.

EFFECTS OF OVEREXPOSURE: Irritation of skin, eyes, mucous membranes.

EMERGENCY AND FIRST AID PROCEDURES

External - Wash with much water; report to doctor.

Internal - Induce vomiting, drink much water; report to doctor.

MAY 18 '84

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE shelf life	1 yr.	

INCOMPATABILITY (Materials to avoid): Moisture, reducers

HAZARDOUS DECOMPOSITION PRODUCTS: in a fire - nitroaromatic compounds, nitric acid, toxic nitrogen and sulfur oxides.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	unless subjected to conditions noted.

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Scoop up into steel container, but avoid spark; or, flush away with water.

WASTE DISPOSAL METHOD: Dispose of in landfill, but avoid contact with oxidizable materials (combustibles); or, add to large volume of reducer solution (ferrous salt), acidify with 3 M H_2SO_4; after reduction is complete, neutralize with soda ash.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type): Type for caustic mist.

VENTILATION	LOCAL EXHAUST: Yes, if general area ventilation is poor.	SPECIAL: -
-	MECHANICAL (General): - -	OTHER: -

PROTECTIVE GLOVES: Yes, rubber	EYE PROTECTION: Yes, goggles

OTHER PROTECTIVE EQUIPMENT: Apron, boots

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Keep dry. Store indoor at max. of 110°F. Avoid contact with moisture, reducers (combustibles).

OTHER PRECAUTIONS: Exothermic reaction with water, mild reducing agents. Violent reaction with strong reducing agents (especially if moisture present.)

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MATERIAL SAFETY DATA SHEET

(R) 4/17/86 INDUSTRIAL HYGIENE

CODE 13501

SECTION I

Manufacture's Name MacDermid Incorporated	EMERGENCY TELEPHONE 203-575-5700
ADDRESS (Number, Street, City, State, Zip Code) 526 Huntingdon Avenue Waterbury, CT. 06720	MFSA EMERGENCY 24 HO HOTLINE: (313) - 644 - 5626
CFR-49 - DOT Proper Shipping Name Non Hazardous	
CHEMICAL NAME AND SYNONYMS N/A	TRADE NAME AND SYNOM Metex Strip Aid
CHEMICAL FAMILY Anti-Reducing Agent	FORMULA Mixture

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVE & SOLVENTS	%	TLV (UNITS)	ALLOYS & METALLIC COATINGS	%	TLV (UNIT
	N/A			N/A	
PIGMENTS	"		BASE METAL	"	
CATALYST	"		ALLOYS	"	
VEHICLE	"		METALLIC COATINGS	"	
SOLVENTS	"		FILLER METAL PLUS OR CORE FLUX	"	
ADDITIVES	"		OTHERS	"	
OTHERS	"				

HAZARDOUS MIXTURES OR OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (UNIT
Salt of nitro aryl sulfonic acid	100	

SECTION III - PHYSICAL DATA

BOILING POINT (F)	N/A	SPECIFIC GRAVITY (H_2O = 1)	
VAPOR PRESSURE (MM. HG.)	0	PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR = 1)	N/A	EVAPORATION RATE (= 1)	
SOLUBILITY IN WATER	Appreciable		

APPEARANCE AND ODOR
Pale yellow to tan powder - odorless

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) N/A	FLAMMABLE LIMITS N/A	LEL	U

EXTINGUISHING MEDIA
Waterspray, CO_2, alcohol, foam, dry chemical.

SPECIAL FIRE FIGHTING PROCEDURES
If material is smoldering, spread burning material out thinly and douse with water.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Material is an oxygen donor and can support combustion.

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SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
Not established for product.

EFFECTS OF OVEREXPOSURE-UNLESS OTHERWISE STATED, CHRONIC OR LONG-TERM HEALTH EFFECTS UNKNOWN!
Possible slight irritation to eyes, skin and mucous memoranes. May be harmful if swallowed. Do not take internally.

EMERGENCY AND FIRST AID PROCEDURES
Eyes: Flush with water for 15 minutes. Contact physician.
Skin: Flush with water.
Internal: Give water, induce vomiting, contact physician.

SECTION VI - REACTIVITY DATA

UNSTABLE		**CONDITIONS TO AVOID**
STABLE	X	

INCOMPATIBILITY (MATERIALS TO AVOID)
Strong Oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS
Oxides of sulfur, carbon and nitrogen, oxygen gas

HAZARDOUS POLYMERIZATION		**CONDITIONS TO AVOID**
MAY OCCUR		
WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Scoop up with steel shovel. Flush remaining material to drain with water.

WASTE DISPOSAL METHOD
Flush to chemical drain. Check government disposal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)
Not normal required.

VENTILATION	**LOCAL EXHAUST** N/A	**SPECIAL** N/A
	MECHANICAL (GENERAL) X	**OTHER** N/A

PROTECTIVE GLOVES Rubber	**EYE PROTECTION** Safety goggles

OTHER PROTECTIVE EQUIPMENT
Protective clothing

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Store in cool, dry area away from open flame, sparks and other sources of ignition.

OTHER PRECAUTIONS
None known

PREPARED BY: Cherrie D. Gillis **DATE:** 4/17/86

13501

SAFETY & WARNING INFORMATION

PMC 1531

Industrial Hygiene – General Requirements

(To be attached to every MacDermid Material Safety Data Sheet.)

INGESTION

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Skin contact should be prevented through the use of impervious clothing, gloves and footwear. A face shield should be worn when use conditions could result in exposure to the material.

EYE CONTACT

Eye contact should be prevented through the use of chemical safety glasses, goggles or face shield.

INHALATION

This material should only be handled in open or well-ventilated areas. Where adequate ventilation is not available and there is possibility of vapor, aerosol or mist generation, control of inhalation can be achieved through the use of a NIOSH-approved, half-face-piece cartridge, air-purifying respirator.

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Keep Flammable Liquids in a segregated area, preferably outside of your facility or in a Flammable Liquid storage cabinet.

DOUBLE LABELED MATERIALS

(Example: Corrosive Liquid, Poisonous NOS). Primary hazard is Corrosive, secondary hazard is Poison. Consider both hazards in storing the material. In this example, do not store near Flammable Solids, Oxidizing or Cyanide Bearing materials because of the corrosive element. Preferably keep double labeled materials separate from all other diamond labeled materials.

ACIDS/ALKALINES

Acid bearing material should be stored separate from Alkaline bearing material.

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MacDermid INCORPORATED
(203) 575-5700 INDUSTRIAL HYGIENE

+ EMERGENCY DIRECTORY ASSISTANCE
(313) 644-5626

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U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

PMC 1531
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Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

COPY TO LOCAL I.A.M. 1746
MAY 18 '82

Phillip Brothers - Supplier

SECTION I

CP #80281

MANUFACTURER'S NAME: Copper Pigment Chemicals	EMERGENCY TELEPHONE NO.: CP: 201 - 636-4300 CHEMTREC: 800 - 424-9300
CP Nickel Strip Salt (PMC 1531)	
ADDRESS (Number, Street, City, State, and ZIP Code): Arbor Street, Sewaren, NJ 07077	
CHEMICAL NAME AND SYNONYMS: Proprietary	TRADE NAME AND SYNONYMS: CP Nickel Strip Salts
CHEMICAL FAMILY: Formulation	FORMULA: Proprietary

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS: Not Applicable			BASE METAL: N.A.		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Nitro Aromatic Sulfonic Acid Soluble Salt		
Inorganic Salt (non-hazardous)		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	N.A.	SPECIFIC GRAVITY (H_2O=1) Bulk Density	750 g/l
VAPOR PRESSURE (mm Hg.)	N.A.	PERCENT, VOLATILE BY VOLUME (%) (water)	17
VAPOR DENSITY (AIR=1)	N.A.	EVAPORATION RATE (_____ =1)	N.A.
SOLUBILITY IN WATER@ 20°C	310g/l	pH = (30% Soln.)	10
APPEARANCE AND ODOR: Yellow crystalline powder.			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used): 200°F approx. (Abel-Pensky)	FLAMMABLE LIMITS	LEL	UEL
EXTINGUISHING MEDIA: CO_2 or dry chemical preferred.			
SPECIAL FIRE FIGHTING PROCEDURES: Avoid inhaling fumes. Move away from combustibles.			
UNUSUAL FIRE AND EXPLOSION HAZARDS: May emit hazardous NO_x and/or SO_x fumes if heated to decomposition (379°C = 714°F). Potential oxidizer.			

(Continued on reverse side)

SECTION V - HEALTH HAZARD DATA

PMC 1531

THRESHOLD LIMIT VALUE: None established

EFFECTS OF OVEREXPOSURE: Acute: Dermatitis, eye or nasal irritation.

Chronic: Anemia possible, others unknown.

EMERGENCY AND FIRST AID PROCEDURES: Wash eyes (under lids) 15 min.; see physician. Wash skin with soap & water. If swallowed, give 2 glasses milk or water; induce vomiting. See physician.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE	379°C	CONDITIONS TO AVOID: Excessive heat
	STABLE		

INCOMPATABILITY *(Materials to avoid)*: Acid, ammonium salts

HAZARDOUS DECOMPOSITION PRODUCTS: Oxides of sulfur and/or nitrogen

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

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SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Sweep up for recycle or disposal as organic chemical waste.

WASTE DISPOSAL METHOD

Combustion or burial in site having local, state and federal approval for aromatic organics.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*: Dust respirator

VENTILATION	LOCAL EXHAUST: Desirable	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES: Rubber

EYE PROTECTION: Goggles

OTHER PROTECTIVE EQUIPMENT: Clean work clothes

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store in cool place away from organics. Keep container tightly closed. Avoid personal contact.

OTHER PRECAUTIONS: Probably not an acute systemic poison, but structure suggests chronic toxicity possible.

PMC 1541

McGean-Rohco, Inc.

1250 Terminal Tower, Cleveland, Ohio 44113. 216/621-6425

MATERIAL SAFETY DATA SHEET

Product Name:	20 XL		Emergency Phone No.: 216/441-4900
Plant Address:	2910 Harvard Avenue Cleveland, OH 44109		Chemtrec Phone No. 800/424-9300
Prepared By:	TSCA Coordinator	Issue Date: 2/82	Revised Date: 2nd 2/87

INGREDIENTS AND HAZARDOUS COMPONENTS

Material	%	TLV	C.A.S. #	Suspect Carcinogen
Nickel Sulfate	1	0.1*	7786-81-4	NO
		mg/M3		
*As Ni				

PHYSICAL DATA

Boiling Point: >100°C	Freezing Point: UK	Specific Gravity: 1.04	pH: 5-6
Vapor Pressure at 20° C: UK	Vapor Density (Air = 1): UK	% Volatiles by Volume: 90	Odor: None
Evaporation Rate (Butyl Acetate = 1) <1		Solubility in Water: Complete	
Appearance and Form: Viscous blue liquid			

FIRE AND EXPLOSION HAZARD DATA

Flash Point: NA	Flammable Limits in Air: % By Volume Upper: NA Lower:
Test Method: NA	
Extinguishing Media: NA	
Special Fire Fighting Procedures: NA	
Unusual Fire and Explosion Hazards: None	
DOT Classification: NA	Note: UK = Unknown NA = Not Applicable

20 XL

HEALTH HAZARD DATA

Effects of Overexposure and Primary Entries to Body:

Primary entry through cuts.
May irritate skin or eyes.

Emergency and First Aid Procedures:

Wash skin with soap and water.
Flush eyes with water for at least 15 minutes.
If any irritation persists, see a physician.

REACTIVITY DATA

☒ Stable ☐ Unstable Conditions to Avoid:

Incompatability — Materials to Avoid: None known

Hazardous Decomposition Products: None known

Hazardous Polymerization: ☐ May Occur ☒ Will Not Occur

SPILL OR LEAK PROCEDURES

Spills:

Flush with water.

Waste Disposal Methods:

Remove nickel by best method.
Take to an EPA approved disposal facility.
Remaining solution can be sewered.

Follow all Local, State and Federal regulations.

SPECIAL PROTECTION INFORMATION

Respirator: Not normally required.

Ventilation: Mechanical

Gloves:	Eye and Face:	Other:
Rubber	Chemical goggles	Sufficient to prevent skin contact.

Handling and Storage:

Normal handling and storing.

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MAY 18 '82 1746

G. E. PARSONS

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved FEB 5 1980
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

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SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
Oxy Metal Industries Corporation	(313) 497-9100
ADDRESS (Number, Street, City, State, and ZIP Code) 21441 Hoover Road Warren, Michigan 48089	
CHEMICAL NAME AND SYNONYMS: Cadmium Brightener #53	TRADE NAME AND SYNONYMS: Same
CHEMICAL FAMILY: Proprietary	FORMULA: Proprietary

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS	No	No	BASE METAL	No	No
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
TIVES			OTHERS		
OTHERS			WATER = 89%		

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES		%	TLV (Units)
An aqueous solution containing a nickel salt as Ni,	<	1.0	1 mg/M^3
Carbohydrate derivatives Sugar	<	10	NA
A fungicide	<	0.001	NA
and an organic wetting agent		X	X

SECTION III - PHYSICAL DATA

BOILING POINT (°F.) greater than	200°	SPECIFIC GRAVITY (H_2O=1) greater than	1
VAPOR PRESSURE (mm Hg.)	NA	PERCENT, VOLATILE BY VOLUME (%)	NA
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____ =1)	NA
SOLUBILITY IN WATER	Soluble		X
APPEARANCE AND ODOR	light green slurry, odorless		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None	None	X	X

EXTINGUISHING MEDIA: None. Product does not burn.

SPECIAL FIRE FIGHTING PROCEDURES: None

UNUSUAL FIRE AND EXPLOSION HAZARDS: None known

PMC 1541

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
None known or established.

EFFECTS OF OVEREXPOSURE
May cause irritation.

EMERGENCY AND FIRST AID PROCEDURES
Flush eyes and skin with water. For eyes get medical attention.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*
Strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS
Unknown

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

MAY 18 '82

1746

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Flush away with water.

WASTE DISPOSAL METHOD
Bury in impervious soil in such manner that rain water run-off will not contaminate sub-surface waters.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
None needed.

VENTILATION	LOCAL EXHAUST: No	SPECIAL: No
	MECHANICAL *(General)*: No	OTHER: No

PROTECTIVE GLOVES: rubber gloves

EYE PROTECTION: chemical safety goggles

OTHER PROTECTIVE EQUIPMENT
none needed

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Avoid excessive skin contact. Do not permit ambient temperature to exceed 110°F or fall below 32°F.

OTHER PRECAUTIONS
For Industrial Use Only. - Do Not Take Internally.

DOT Class: Not Regulated, Non-Hazardous
Label: Compounds, Electroplating additive

JUL 2 0 1977

THE INFORMATION PRES ED HEREIN HAS BEEN COMPILED FROM SOURC ONSIDERED TO BE DEPENDABLE AND IS ACCURATE TO THE BE. OF SELLER'S KNOWLEDGE, HOWEVER, SELLER MAKES NO WARRANTY WHATSOEVER, EXPRESSED, IMPLIED OR OF MERCHANTABILITY REGARDING THE ACCURACY OF SUCH DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. SELLER ASSUMES NO RESPONSIBILITY FOR INJURY TO BUYER OR TO THIRD PERSONS OR FOR ANY DAMAGE TO ANY PROPERTY AND BUYER ASSUMES ALL SUCH RISKS."

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PMC 1541

MATERIAL SAFETY DATA SHEET

NPVLA 6-

(Approved by U. S. Department of Labor "Essentially Similar" to form LSB-005-4)

Section I

MANUFACTURER'S NAME: Rohco, Inc.

STREET ADDRESS: 3203 West 71st Street

CITY, STATE, AND ZIP CODE: Cleveland, Ohio 44102

EMERGENCY TELEPHONE NO.: (216) 651-7300

CHEMICAL NAME AND SYNONYMS	TRADE NAME
	Rohco 20XL
CHEMICAL FAMILY	FORMULA

Section II – HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS

PIGMENTS	%	TLV (Units)	SOLVENTS	%	TLV (Units)
CATALYST			ADDITIVES		
VEHICLE			OTHERS		

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Contains about 2% Nickel Sulfate 1 mg/m³	as	Ni
Contains no other ingredients known to be hazardous. Our plant experience with the concentrated ingredients has shown no hazardous effects.		

Section III – PHYSICAL DATA

BOILING POINT (°F.)	205-210° F.	SPECIFIC GRAVITY (H_2O=1)	1.04
VAPOR PRESSURE (mm Hg.)	about 18 mm	PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)	about 0.62	EVAPORATION RATE (.....ether..=1)	Less than 1
SOLUBILITY IN WATER	Complete		
APPEARANCE AND ODOR	Viscous blue liquid, odorless.		

Section IV – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED)	FLAMMABLE LIMITS	Lel	Uel
Not flammable.			

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES

COPY TO LOCAL I.A.M.

UNUSUAL FIRE AND EXPLOSION HAZARDS

MAY 18 '82 1746

PMC 1541

Section V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE
Product may be slightly irritating to skin and eyes.

EMERGENCY AND FIRST AID PROCEDURES
Skin contact: Wash affected area well with soap and water.
Eye contact: Flush eyes with water at least 15 minutes and get medical attention if irritation persists.

Section VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

Section VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Cover with soda ash, mix and scoop into a beaker of water. Neutralize with 6 M HCl and wash down drain with excess water.

WASTE DISPOSAL METHOD
Add slowly to a large container of water. Stir in slight excess of soda ash. Let stand 24 hours. Decant or siphon into another container and neutralize with 6 M HCl before washing down drain with large excess of water. The sludge may be added to land fill.

Section VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL *(General)* To keep below TLV	OTHER

PROTECTIVE GLOVES Recommended

EYE PROTECTION Goggles Recommended

OTHER PROTECTIVE EQUIPMENT

Section IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Store above 50° F. to keep product from freezing.

OTHER PRECAUTIONS

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MAY 18 '82 1746

PMC 1541

OMI INTERNATIONAL CORPORATION
21441 Hoover Road, Warren, MI 48089

24-Hour EMERGENCY Phone Number
313-497-9129

MATERIAL SAFETY DATA SHEET

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REVISION: 4/21/88

May be used to comply with OSHA's Hazard Communication Standard, 29CFR 1910. 1200. Standard must be consulted for specific requirements.

Section I

Product Trade Name: UDYLITE: BRY-CAD® 53 Brightener
Proprietary Formulation

Section II

Hazardous Components	CAS No.	Percentage	TLV OSHA ACGIH	Listed: NTP/IARC/OSHA Z/EPA Carcinogen/Mutagen/Toxic/Teratogen
Nickel Compound/ Soluble as Ni	7440-02-0	0.6	0.1 mg/m³	NTP anticipated human carcinogen IARC probable human carcinogen (2A) OSHA Z

Section III

Physical Data

Appearance and Odor: Light green liquid with no odor.

Solubility in Water:

Negligible	<0.1%	
Slight	0.1-1.0%	
Moderate	1.0-10.0%	
Appreciable	>10.0%	
Complete(all proportions)		X

Boiling Point	N/A
Vapor Pressure	N/A
Percent Volatile by Volume	N/A
Evaporation Rate	N/A
Specific Gravity	1.03
pH	5.5

Section IV

Fire and Explosion Hazard Data

Flash Point (method used): None
Flammable/Explosive Limits LEL N/A UEL N/A
NFPA Code (0-4): Health 1 Flammability 0 Reactivity 0

Extinguishing Media: Product will not burn.
Special Fire-Fighting Procedures: Use media suitable for surrounding fire.
Unusual Fire and Explosion Hazards: None known.

Section V

Health Hazard Data

Threshold Limit Value: None known or established.
Effects of Overexposure:
Acute: May cause eye and skin irritation.
Chronic: Repeated contact may result in rash, "nickel itch."
Principal Route of Exposure: Contact.
Emergency First Aid Procedures:
Eye: Flush with a directed stream of water for 15 minutes. Seek medical attention.
Skin: Wash with soap and water.
Inhalation: Remove to fresh air.
Swallowing: Drink water (2-3 glasses) to dilute. Seek medical attention.

PMC 1541

OMI International Corporation Material Safety Data Sheet

Product Trade Name BRY-CAD® 53 Brightener

Reactivity Data — Section VI

Stability: Stable X Unstable ____

Incompatibility (Materials to Avoid): None known

Hazardous Decomposition Products: None

Hazardous Polymerization: May Occur ____ Will Not Occur X

Spill or Leak Procedures — Section VII

Steps to be taken in case material is released or spilled:
Contain and place into a container suitable for transportation to a licensed waste treatment facility.

Waste Disposal Method: Licensed waste treatment facility.

EPA I.D. Number: N/A RQ: N/A

Special Protection Information — Section VIII

Ventilation:
Local Exhaust: Yes Respiratory Protection: No

Protective Clothing:
Gloves: butyl rubber or neoprene Boots: No
Chemical Safety Goggles: Yes Other: No
Full Face Shield: No

Note: Eye Fountain and Safety Shower must always be available.

Special Precautions — Section IX

Handling & Storage: No special requirements.

Other: None

Shipping Information — Section X

DOT Proper Shipping Name: None

Hazard Class: None

DOT Label(s): None

IATA Class: N/A Packing Group: N/A

IMDGC Class: N/A Packing Group: N/A

Prepared by: Carl N. Gilsdorf, Manager, Quality Assurance Date 4/21/88

This form has been prepared and reviewed by technically knowledgeable people and is based on information OMI International Corporation believes to be reliable. This information is provided solely to provide health and safety guidelines and is not to be intended for any other purpose.

PMC 1551

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FEB 18 1983

G. E PARSON

ARD:df(R) 8/28/81

U. S. DEPARTMENT OF LABOR

WAGE AND LABOR STANDARDS ADMINISTRATION

Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

UTCIHL

16517

SECTION I

MANUFACTURER'S NAME: MACDERMID, INC.	EMERGENCY TELEPHONE NO.: 203-754-6161
ADDRESS (Number, Street, City, State, and ZIP Code): 526 HUNTINGDON AVENUE, WATERBURY, CONNECTICUT 06720	
CHEMICAL NAME AND SYNONYMS:	TRADE NAME AND SYNONYMS: Metex Non Pitter N-17 No. 16
CHEMICAL FAMILY: Surfactant	FORMULA:

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TL (Uni
PIGMENTS	-		BASE METAL	-	
CATALYST	-		ALLOYS	-	
VEHICLE	-		METALLIC COATINGS	-	
SOLVENTS	-		FILLER METAL PLUS COATING OR CORE FLUX	-	
ADDITIVES	-		OTHERS	-	
OTHERS	-				

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Unit
Potassium Hydroxide	< 2.0	2mg/

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	> 212	SPECIFIC GRAVITY (H_2O=1)	1.019
VAPOR PRESSURE (mm Hg.)	Aqueous	PERCENT VOLATILE BY VOLUME (%)	-
VAPOR DENSITY (AIR=1)	-	EVAPORATION RATE (_____ =1)	-
SOLUBILITY IN WATER	Complete		
APPEARANCE AND ODOR	Clear, colorless liquid - no odor.		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	Non Flammable	FLAMMABLE LIMITS	NA	Lel / Uel
EXTINGUISHING MEDIA	Compatible with waterspray, CO_2, dry chemical, foam, Halon.			
SPECIAL FIRE FIGHTING PROCEDURES	None			
UNUSUAL FIRE AND EXPLOSION HAZARDS	None			

PMC 1556

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	Not established for product. See Section II.
EFFECTS OF OVEREXPOSURE	Irritation to eyes, skin and mucous membranes.
EMERGENCY AND FIRST AID PROCEDURES	Eyes - Flush with water for 15 minutes. Contact physician.
	Skin - Flush with water.
	Internal - Give water, contact physician.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY (Materials to avoid): Strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS: Oxides of carbon and nitrogen.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Flush with water to drain.

WASTE DISPOSAL METHOD: Adjust pH to 6 to 8 with dilute acid and discard.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type): Not normally required.

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General) x	OTHER

PROTECTIVE GLOVES: Rubber	EYE PROTECTION: Goggles

OTHER PROTECTIVE EQUIPMENT: Rubber apron.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Keep in closed containers in a cool storage location.

OTHER PRECAUTIONS:

ARD:hgg UTC IHL
10/7/80

√ PMC 1557

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G. E. PARSONS
Code: 13514

U. S. DEPARTMENT OF LABOR
WAGE AND LABOR STANDARDS ADMINISTRATION
Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
MACDERMID, INC.	203-754-6161
ADDRESS (Number, Street, City, State and ZIP Code)	
526 HUNTINGDON AVENUE, WATERBURY, CONNECTICUT 06720	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS: Metex Stripper X-343
CHEMICAL FAMILY	FORMULA

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS Not Applicable			BASE METAL Not Applicable		
CATALYST " "			ALLOYS " "		
VEHICLE " "			METALLIC COATINGS " "		
SOLVENTS " "			FILLER METAL PLUS COATING OR CORE FLUX " "		
ADDITIVES " "			OTHERS " "		
OTHERS " "					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS OR GASES	%	TLV (Units)
Telephone Conversation: Sodium salts		
Other materials: Proprietary		

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	NA	SPECIFIC GRAVITY (H_2O=1)	--
VAPOR PRESSURE (mm Hg.)	0	PERCENT VOLATILE BY VOLUME (%)	0
VAPOR DENSITY (AIR 1)	NA	EVAPORATION RATE (_____ =1)	NA
SOLUBILITY IN WATER	appreciable		
APPEARANCE AND ODOR	Off-white to tan powder		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	N.A.	FLAMMABLE LIMITS	LEL	UEL
		N.A.		
EXTINGUISHING MEDIA	Water spray, CO_2, alcohol foam, dry chemical			
SPECIAL FIRE FIGHTING PROCEDURES	If material is smoldering, spread burning material out thin and douse with water.			
UNUSUAL FIRE AND EXPLOSION HAZARDS	Material is an oxygen donor and can support combustion.			

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MAY 18 '82

1746

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MAY 18 '82 1746 PMC 1-57

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	Not established for product. Acute toxicity of low order.
EFFECTS OF OVEREXPOSURE	Possible slight irritation to skin.
EMERGENCY AND FIRST AID PROCEDURES	Eyes - Flush with water for 15 minutes. Contact physician. Skin - Flush with water.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	
INCOMPATABILITY (Materials to avoid)	Strong oxidizers		
HAZARDOUS DECOMPOSITION PRODUCTS	Oxides of sulfur, carbon and nitrogen, oxygen gas.		
HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED	Flush with water to drain.
WASTE DISPOSAL METHOD	Flush with water to drain.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)	Not normally required.		
VENTILATION	LOCAL EXHAUST		SPECIAL
	MECHANICAL (General)	X	OTHER
PROTECTIVE GLOVES	Rubber	EYE PROTECTION	Safety glasses
OTHER PROTECTIVE EQUIPMENT			

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING	Store in dry area away from open flame.
OTHER PRECAUTIONS	

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PMC 1531

PMC 1357

MATERIAL SAFETY DATA SHEET

R) 9/18/87

CODE 13501

SECTION 1

Manufacturer's Name MacDermid Incorporated	**EMERGENCY TELEPHONE** 203-575-5700
ADDRESS (Number, Street, City, State, Zip Code) 526 Huntingdon Avenue Waterbury, CT. 06708	**MFSA EMERGENCY 24 HOUR HOTLINE: (Medical)** (313) - 644 - 5626
CFR-49 - DOT Proper Shipping Name Non Hazardous	
CHEMICAL NAME AND SYNONYMS N/A	**TRADE NAME AND SYNOMYM** Metex Strip Aid
CHEMICAL FAMILY Salt of Sulfonic Acid	**FORMULA** Mixture

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVE & SOLVENTS	%	TLV (UNITS)	ALLOYS & METALLIC COATINGS	%	TLV (UNITS)
	N/A			N/A	
PIGMENTS	"		BASE METAL	"	
CATALYST	"		ALLOYS	"	
VEHICLE	"		METALLIC COATINGS	"	
SOLVENTS	"		FILLER METAL PLUS OR CORE FLUX	"	
ADDITIVES	"		OTHERS	"	
OTHERS	"				

HAZARDOUS MIXTURES OR OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (UNITS)
Salt of sulfonic acid (27215-71-0)	100	Not listed

SECTION III - PHYSICAL DATA

BOILING POINT (F)	N/A	**SPECIFIC GRAVITY (H_2O = 1)**	N/A
VAPOR PRESSURE (MM. HG.)	0	**PERCENT VOLATILE BY VOLUME (%)**	0
VAPOR DENSITY (AIR = 1)	N/A	**EVAPORATION RATE (= 1)**	N/A
SOLUBILITY IN WATER	Appreciable		

APPEARANCE AND ODOR
Pale yellow to tan powder - odorless

SECTION IV = FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) Non-flammable	**FLAMMABLE LIMITS** N/A	~~LEL~~	~~UEL~~

EXTINGUISHING MEDIA
Waterspray, CO_2, alcohol, foam, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES
If material is smoldering, spread burning material out thinly and douse with water. Wear self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Material is an oxygen donor and can support combustion.

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

Not established for product.

EFFECTS OF OVEREXPOSURE-UNLESS OTHERWISE STATED, CHRONIC OR LONG-TERM HEALTH EFFECTS UNKNOWN

Possible slight irritation to eyes, skin and mucous membranes.

EMERGENCY AND FIRST AID PROCEDURES

EYES: Flush with water for 15 minutes. Contact physician.
SKIN: Flush with water.
INTERNAL: Give water. Do not induce vomiting. Contact physician.
INHALATION: Remove to fresh air.

SECTION VI - REACTIVITY DATA

UNSTABLE		**CONDITIONS TO AVOID**
STABLE	X	N/A

INCOMPATIBILITY (MATERIALS TO AVOID)

Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS

Oxides of sulfur, carbon and nitrogen, oxygen gas

HAZARDOUS POLYMERIZATION		**CONDITIONS TO AVOID**
MAY OCCUR		N/A
WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED - WEAR PROTECTIVE CLOTHING. NEV.

DISCHARGE DIRECTLY INTO SEWERS OR WATERWAYS

Scoop up with steel shovel. Flush remaining material to chemical drain with water.

WASTE DISPOSAL METHOD - ALWAYS CHECK AND COMPLY WITH GOVERNMENT DISPOSAL REGULATIONS

Flush to chemical drain. Check government disposal regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (SPECIFY TYPE)

Not normally required

VENTILATION	**LOCAL EXHAUST**		**SPECIAL**
	N/A		N/A
	MECHANICAL (GENERAL)		**OTHER**
	X		N/A

PROTECTIVE GLOVES	**EYE PROTECTION**
Rubber	Safety goggles

OTHER PROTECTIVE EQUIPMENT

Protective clothing

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Store in cool, dry area away from open flame, sparks and other sources of ignition.

OTHER PRECAUTIONS - AVOID EYE AND SKIN CONTACT. ALWAYS WASH CLOTHING BEFORE RE-USE

Wash thoroughly after handling.

PREPARED BY: MacDermid Incorporated **DATE:** 9/18/87

Akton Cross Co.
Supplier
UTC IHLAB

Occupational Safety and Health Administration

MATERIAL SAFETY DATA SHEET

PMC 1807
PMC 1601
EC - Other

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Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

PMC 1807 G.E. PARSONS

Allied Chemical Corporation Specialty Chemicals Division	EMERGENCY TELEPHONE NO. (201) 455-2000
ADDRESS P.O. Box 1087R, Morristown, NJ 07960	
CHEMICAL NAME AND SYNONYMS Sodium Hydroxide; Caustic Soda; Lye	TRADE NAME AND SYNONYMS Sodium Hydroxide,
CHEMICAL FAMILY Alkali	FORMULA NaOH Flake /Pellet

MAY 18 '82

1746

SECTION II - HAZARDOUS INGREDIENTS N.A.

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Nickel--soluble compounds (as Ni)	<0.001	0.1 mg/m^3

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	2532	SPECIFIC GRAVITY (H_2O=1) (solid)	2.13
VAPOR PRESSURE (mm Hg.) Negligible	@ ambient	PERCENT, VOLATILE BY VOLUME (%) Negligible @ ambient	
VAPOR DENSITY (AIR=1) N.A. (vapor	" @ ")	EVAPORATION RATE (_____ =1) "	@ "
SOLUBILITY IN WATER	Appreciable		
APPEARANCE AND ODOR	White flakes or pellets with no odor.		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None	None		

EXTINGUISHING MEDIA
Flood with water, using care not to splatter or splash.

SPECIAL FIRE FIGHTING PROCEDURES
Wear self-contained breathing apparatus approved by NIOSH and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Will release flammable and explosive hydrogen gas when in contact with aluminum, lead, tin, zinc, and their alloys. Contact with water or moisture may generate sufficient heat to ignite combustible materials.

Form OSHA-20
Rev. Nov., 1977
Supersedes - new

DOT Class Corrosive Material DOT Label Corrosive

PMC 1807
PMC 1601

SECTION V - HEALTH HAZARD DA

THRESHOLD LIMIT VALUE: 2mg/M^3 (ceiling)

EFFECTS OF OVEREXPOSURE: Skin: may cause severe burns on contact. Eyes: rapidly causes severe damage to eyes. Dust or mist inhalation: May damage entire respiratory tract.

EMERGENCY AND FIRST AID PROCEDURES: Speed in removal of caustic is of primary importance. Skin: flush with large amounts of water. Continue washing up to 1 or 2 hrs. or until medical help arrives. Eyes: irrigate immediately with copious amounts of water for at least 15 minutes. Get physician's treatment at once for eye and skin burns and when inhaled.

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	x	

INCOMPATABILITY (Materials to avoid): See page 3

HAZARDOUS DECOMPOSITION PRODUCTS: See hydrogen generation, Section IV

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	x	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Immediately sweep up carefully and remove, providing personal protection and avoiding contact with metals. Dissolve and flush away remainder, keeping out of sewers. In the event of hydrogen generation, evacuate and ventilate with explos proof arrangement. Dilute acid, preferably acetic acid, may be used carefully to neutralize final caustic traces.

WASTE DISPOSAL METHOD: If disposal regulations permit discharge of neutral solutions, dissolve in water, cool and neutralize carefully with dilute acid, such as acetic. Then flush to sewer with lots of water. Disposal by a licensed contractor may otherwise be needed.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type): If misty or dusty, use special (mechanical) filter respirator.*

VENTILATION		
	LOCAL EXHAUST: As necessary to eliminate dust or mist.	SPECIAL
	MECHANICAL (General): Adequate in absence of dust or mist.	OTHER

PROTECTIVE GLOVES	EYE PROTECTION
Rubber, neoprene or NBR	Chemical Safety Goggles

OTHER PROTECTIVE EQUIPMENT: Face shields, hard hats, rubber aprons, boots, or shoes and rubber clothing as necessary to prevent skin contact.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Do not mix hot water with caustic soda. In diluting, add caustic carefully to cold water with stirring as heat is evolved. Heat is also evolved in neutralizing caustic. Use care to avoid spattering of caustic solutions.

OTHER PRECAUTIONS: For further details see MCA Chemical Safety Data Sheet SD-9 on Caustic Soda available from the Manufacturing Chemists Association, 1825 Connecticut Ave., N.W. Washington, D.C. 20009 (19 Precautions listed apply also to aqueous solutions.

*If hydrogen is being generated, use hose mask or self-conta breathing apparatus.

F.C.H.

LCP CHEMICALS & PLASTICS INC.

Raritan Plaza II • Raritan Center
Edison N.J. 08837

UTCIHL 16

DATE: 9/84
PMC 1601
Emergency Phone No.
(315) 487-4700

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Axton-Cross Co.

MATERIAL SAFETY DATA
FOR
CAUSTIC POTASH DRY

SECTION I MATERIAL IDENTIFICATION

CHEMICAL NAME: Potassium Hydroxide - Solid
SYNONYMS: Potassium Hydrate, Caustic Potash, Potassa, Lye
TRADE NAME & SYNONYMS: Potassium Hydroxide, Dry, Solid, Flake, Anhydrous
CHEMICAL FORMULA: KOH - 85% and 90%
C.A.S. NO.: 1310583
D.O.T. HAZARD CLASS: Corrosive Class 8 RQ: 1000 lbs., 454 Kg.
D.O.T. IDENTIFICATION NO.: UN 1813
D.O.T. SHIPPING NAME: Potassium Hydroxide, Dry, Solid, Flake
CHEMICAL FAMILY: Alkali
PACKAGING: R-35 S-2, 26, 37, 38, 39 D.O.T. EMERGENCY GUIDE NO. 60
LABELING: Placard corrosive NFPA REGISTRY: 3-0-1

SECTION II INGREDIENTS & HAZARDS

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS OR GASES: This material reacts violently with acids, halogenated hydrocarbons, nitrocarbons and trichloroethylene. Anhydrous KOH can slowly pick up moisture from the atmosphere and react with carbon dioxide from air to form potassium carbonate. It also reacts with aluminum, tin and zinc in presence of moisture.

INGREDIENTS: 85 & 90% KOH
Trace impurities
Remainder is water.

SECTION III PHYSICAL DATA

BOILING POINT: 2500°F
VAPOR PRESSURE (mm Hg): @ 1000°C = 40 to 50
VAPOR DENSITY (Air=1): N.A.
SOLUBILITY IN WATER: @ 20°C 52.8% by weight.
APPEARANCE & ODOR: White hygroscopic flake, pellet, brickett, etc., no odor.
SPECIFIC GRAVITY (H2O=1): 2.044
PERCENT VOLATILE BY VOLUME (%): Nonvolatile at room temperature.
EVAPORATION RATE (H2O=1): N.A.
MELTING POINT: 715°F
MOLECULAR WEIGHT: 56.10
This material generates considerable amounts of heat when dissolved in water.

LCP CHEMICALS MATERIAL SAFETY DATA PMC 1601

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: Not combustible.
FLAMMABLE LIMITS: None.
EXTINGUISHING MEDIA: Suitable for surrounding fire. Keep material cool and dry.
SPECIAL FIRE FIGHTING PROCEDURES: None
UNUSUAL FIRE & EXPLOSION HAZARDS: This material can melt and flow when heated to 715°F. Hot molten material will react violently with water resulting in spattering and fuming.
ADDITIONAL INFORMATION: In the molten or liquid state, this material will react with some metals such as aluminum, tin, zinc, etc. to produce flammable hydrogen.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: TWA - None 2 mg/CU.M. is suggested.
EFFECTS OF OVEREXPOSURE: This is a strong alkali which is destructive to all human tissue. See additional information.
EMERGENCY AND FIRST AID PROCEDURES:
INHALATION: Remove from exposure and get medical help.
SKIN: Prolonged washing with tempered water. Burns to be treated by a physician or trained medic.
EYES: Prolonged washing with water - get medical help.
INGESTION: Drink plenty of water or fruit juice. Do not induce vomiting - get prompt medical help.
ADDITIONAL INFORMATION:
INHALATION: Mist or spray can injure or damage the entire respiratory tract.
SKIN: Can cause serious chemical burns.
EYES: Contact can cause severe to permanent injury.

SECTION VI REACTIVITY DATA

STABILITY: Stable under normal conditions.
CONDITIONS TO AVOID: Organic chemicals, nitrocarbons, and halocarbons, also reactive metals such as aluminum, tin and zinc and contact with acids.
INCOMPATABILITY (MATERIALS TO AVOID): Same as listed above.
HAZARDOUS DECOMPOSITION PRODUCTS: None.
HAZARDOUS POLYMERIZATION (MAY OCCUR/WILL NOT OCCUR): None.
CONDITIONS TO AVOID: When exposed to air, KOH will react with carbon dioxide to form potassium carbonate.
ADDITIONAL INFORMATION: Trichloroethylene will react to form dichloracetylene which is spontaneously flammable.

MATERIAL SAFETY DATA CAUSTIC POTASH, DRY

LCP CHEMICALS MATERIAL SAFETY DATA PMC 1601

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Shovel up spills and place in sealable containers for recovery or disposal. Delay in clean up will allow absorption of atmospheric moisture and increase problems associated with clean-up. Avoid dusting or body contact. Recover all material possible when in its dry state. Use weak acid to neutralize remaining spillage and flush with water. Confine the spill site, tools and clothing to a small area.

WASTE DISPOSAL METHODS: Preplanning is essential - follow approved disposal procedure or contact your supplier. Follow Federal, State and local regulations to meet legal and technical requirements. Do not dispose of it to sewers or non chemical solids waste sites. Dilute with water, neutralize to a salt solution before disposal to regular outfall.

ADDITIONAL INFORMATION: Safety eyewash/shower station should be located in the handling area.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATOR PROTECTION (SPECIFY TYPE): A Class 2B NIOSH approved particle respirator or dust filter mask should be worn if dust is present.

VENTILATION (LOCAL EXHAUST AND/OR MECHANICAL): Provide adequate ventilation to meet TLV requirement if above suggested limit.

PROTECTIVE GLOVES: Rubber.

EYE PROTECTION: Close fitting (face seal) goggles.

OTHER PROTECTIVE EQUIPMENT: Rubber work boots, hard hat, rubber apron or rain suit. Do not use wool or leather.

ADDITIONAL INFORMATION: Safety showers and eye wash facilities should be available.

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store in well sealed containers. Avoid handling procedures that lead to dusting, leaks or spills. Keep storage area dry and separate from acids. Do not store near halogenated hydrocarbons or reactive metals.

OTHER PRECAUTIONS: Drains should have retention basins to allow for neutralization of spills or waste prior to disposal.

ADDITIONAL INFORMATION: Do not permit personnel to handle this material without proper training and equipment.

LCP CHEMICALS MATERIAL SAFETY DATA PMC 1601

MATERIAL SAFETY DATA CAUSTIC POTASH, DRY

REVISED: 9/84
SUPERSEDES: New
LCP MSDS NO.: 001310583
FOR ADDITIONAL INFORMATION OR TECHNICAL SERVICE CONTACT OUR TECHNICAL SERVICE DEPARTMENT.

LCP Chemical and Plastics, Inc.
P.O. Box 98
Mathews Avenue
Solvay, N.Y. 13209
(315) 487-4700 (Collect)

SECTION VI - REACTIVITY DATA

Hazardous Decomposition Products (cont'd)

Imcompatability

Aluminum
Lead
Tin
Zinc
Acids and their anhydrides
Acrolein
Acrylonitrile
Allyl Chloride
Allyl Alcohol
Dichloroethylene
Glyoxal
Hydroquinone
Nitroparaffins
Phosphorous
Phosphorous Pentoxide
Tetrahydrofuran
Trichloroethylene

By analogy with potassium hydroxide experience the following may be considered incompatible:

Ortho-Nitrophenol, Tetrachloroethane

Generalizing further, all chlorinated hydrocarbons and other chlorinated organic compounds are probably a potential hazard of this type.

COPY TO LOCAL I.A.M.

MAY 18 '82 1746

72-62-7820-0 UTC L 16

MATERIAL SAFETY DATA SHEET

Ashland Chemical Company
DIVISION OF ASHLAND OIL, INC.
P. O. BOX 2219, COLUMBUS, OHIO 43216 • (614) 889-3333

24-HOUR EMERGENCY TELEPHONE (606) 324-1133

PMC 1691

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JUN 17 1986
INDUSTRIAL HYGIENE

001845 CAUSTIC SODA FLAKE 400# DRUM

THIS MSDS COMPLIES WITH 29 CFR 1910.1200 (THE HAZARD COMMUNICATION STANDARD)

****

PRODUCT NAME: CAUSTIC SODA FLAKE 400# DRUM
CAS NUMBER: 1310 73 2

PRATT AND WHITNEY
400 MAIN STREET
EAST HARTFORD CT 06108

ATTN: PLANT MGR./SAFETY DIR.

05 50 077 7228590-
DATA SHEET NO: 0031922-001
LATEST REVISION DATE: 03/86-86063
PRODUCT: 3150260
INVOICE: 043995
INVOICE DATE: 05/24/86
TO: PRATT AND WHITNEY
8801 MACON ROAD
COLUMBUS GA 31908

SECTION I-PRODUCT IDENTIFICATION

GENERAL OR GENERIC ID: ALKALI

DOT HAZARD CLASSIFICATION: CORROSIVE MATERIAL (173.240)

SECTION II-COMPONENTS

INGREDIENT	% (BY WT)	PEL	TLV	NOTE
SODIUM HYDROXIDE CAS #: 1310-73-2	100	2	2 MG/M3 - CEILING	

SECTION III-PHYSICAL DATA

PROPERTY	REFINEMENT	MEASUREMENT
BOILING POINT	NOT APPLICABLE	
VAPOR PRESSURE	NOT APPLICABLE	
SPECIFIC VAPOR DENSITY	NOT APPLICABLE	
SPECIFIC GRAVITY		2.130 @ 77.00 DEG F (25.00 DEG C)
PERCENT VOLATILES	NOT APPLICABLE	
EVAPORATION RATE	NOT APPLICABLE	

SECTION IV-FIRE AND EXPLOSION INFORMATION

FLASH POINT NOT APPLICABLE

EXPLOSIVE LIMIT NOT APPLICABLE

EXTINGUISHING MEDIA:

SPECIAL FIRE & EXPLOSION HAZARDS: CAN REACT WITH CHEMICALLY REACTIVE METALS SUCH AS ALUMINUM, ZINC, MAGNESIUM, COPPER ETC. TO RELEASE HYDROGEN GAS WHICH CAN FORM EXPLOSIVE MIXTURES WITH AIR.

SECTION V-HEALTH HAZARD DATA

PERMISSIBLE EXPOSURE LEVEL	2	MG/M3 - CEILING
THRESHOLD LIMIT VALUE	2	MG/M3 - CEILING

EFFECTS OF ACUTE OVEREXPOSURE: FOR PRODUCT

EYES - CAUSES SEVERE DAMAGE AND EVEN BLINDNESS VERY RAPIDLY.
SKIN - CAUSES BURNS, POSSIBLE DEEP ULCERATION.
BREATHING - OF DUST CAN CAUSE DAMAGE TO NASAL AND RESPIRATORY PASSAGES.
SWALLOWING - RESULTS IN SEVERE DAMAGE TO MUCOUS MEMBRANES AND DEEP TISSUES, CAN RESULT IN DEATH ON PENETRATION TO VITAL AREAS.

FIRST AID:

IF ON SKIN: IMMEDIATELY FLUSH EXPOSED AREA WITH WATER FOR AT LEAST 15 MINUTES, GET MEDICAL ATTENTION. REMOVE CONTAMINATED CLOTHING. LAUNDER CONTAMINATED CLOTHING BEFORE RE-USE.
DISCARD CONTAMINATED SHOES.

IF IN EYES: IMMEDIATELY FLUSH WITH LARGE AMOUNTS OF WATER FOR AT LEAST 15 MINUTES, LIFTING UPPER AND LOWER LIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION. IF PHYSICIAN IS NOT IMMEDIATELY AVAILABLE, CONTINUE FLUSHING WITH WATER. DO NOT USE CHEMICAL ANTIDOTE.

IF SWALLOWED: DO NOT INDUCE VOMITING. VOMITING WILL CAUSE FURTHER DAMAGE TO THE THROAT. DILUTE BY GIVING WATER. GIVE MILK OF MAGNESIA. KEEP WARM, QUIET. GET MEDICAL ATTENTION IMMEDIATELY.

CONTINUED ON PAGE: 2

PMC 1691

Ashland Chemical Company
DIVISION OF ASHLAND OIL, INC.
P. O. BOX 2219, COLUMBUS, OHIO 43216 • (614) 889-3333
24-HOUR EMERGENCY TELEPHONE (606) 324-1133

SECTION VI-REACTIVITY DATA

HAZARDOUS POLYMERIZATION: CANNOT OCCUR

STABILITY: STABLE

INCOMPATIBILITY: AVOID CONTACT WITH:, REACTIVE METALS SUCH AS ALUMINUM AND MAGNESIUM, ORGANIC MATERIALS, WATER, STRONG ORGANIC ACIDS, COPPER, STRONG MINERAL ACIDS.

SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

SMALL SPILL: SWEEP UP MATERIAL ONTO PAPER.

LARGE SPILL: COLLECT AND ADD SLOWLY TO LARGE VOLUME OF WATER.

WASTE DISPOSAL METHOD:

SMALL SPILL: DISSOLVE IN LARGE AMOUNT OF WATER AND NEUTRALIZE WITH 6M-HYDROCHLORIC ACID. FLUSH DOWN DRAIN WITH EXCESS WATER IN ACCORDANCE WITH APPLICABLE REGULATIONS.

LARGE SPILL: POUR INTO A LARGE TANK OF WATER AND NEUTRALIZE. FLUSH TO DRAIN WITH LARGE EXCESS OF WATER IN ACCORDANCE WITH APPLICABLE REGULATIONS.

SECTION VIII-PROTECTIVE EQUIPMENT TO BE USED

RESPIRATORY PROTECTION: IF TLV OF THE PRODUCT OR ANY COMPONENT IS EXCEEDED, A NIOSH/MSHA JOINTLY APPROVED AIR SUPPLIED RESPIRATOR IS ADVISED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. OSHA REGULATIONS ALSO PERMIT OTHER NIOSH/MSHA RESPIRATORS UNDER SPECIFIED CONDITIONS. (SEE YOUR SAFETY EQUIPMENT SUPPLIER). ENGINEERING OR ADMINISTRATIVE CONTROLS SHOULD BE IMPLEMENTED TO REDUCE EXPOSURE.

VENTILATION: PROVIDE SUFFICIENT MECHANICAL (GENERAL AND/OR LOCAL EXHAUST) VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S)

PROTECTIVE GLOVES: WEAR RESISTANT GLOVES SUCH AS:, NEOPRENE, NITRILE RUBBER, POLYVINYL CHLORIDE, POLYETHYLENE

EYE PROTECTION: CHEMICAL SPLASH GOGGLES AND FACE SHIELD (8" MIN.) IN COMPLIANCE WITH OSHA REGULATIONS ARE ADVISED; HOWEVER, OSHA REGULATIONS ALSO PERMIT OTHER TYPE SAFETY GLASSES. (CONSULT YOUR SAFETY EQUIPMENT SUPPLIER)

OTHER PROTECTIVE EQUIPMENT: TO PREVENT SKIN CONTACT, WEAR IMPERVIOUS CLOTHING AND BOOTS.

SECTION IX-SPECIAL PRECAUTIONS OR OTHER COMMENTS

CONTAINERS OF THIS MATERIAL MAY BE HAZARDOUS WHEN EMPTIED SINCE EMPTIED CONTAINERS RETAIN PRODUCT RESIDUES (VAPOR, LIQUID, AND/OR SOLID), ALL HAZARD PRECAUTIONS GIVEN IN THE DATA SHEET MUST BE OBSERVED.

THE INFORMATION ACCUMULATED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE WHETHER ORIGINATING WITH THE COMPANY OR NOT. RECIPIENTS ARE ADVISED TO CONFIRM IN ADVANCE OF NEED THAT THE INFORMATION IS CURRENT, APPLICABLE, AND SUITABLE TO THEIR CIRCUMSTANCES.

PMC 1601

UTCIHL 16

DATE MSDS PRINTED: 2/27/86
SOURCE: LCP MSDS,9/84

****
* *
* MATERIAL SAFETY DATA SHEET *
* *
****

Caustic soda liquid

ISSUED BY:

W.H. SHURTLEFF COMPANY
ONE RUNWAY RD., P.O. BOX 2800
SOUTH PORTLAND, ME. 04106
207-883-6371

ABBREVIATIONS

~ = Approximately
AMT = Amount
B.A.= Butyl Acetate
B.D.= Bulk Density
CALC= Calculated
CC = Closed Cup
COC = Cleveland Open Cup
CNS = Central Nervous System
CO2 = Carbon Dioxide
EST = Estimated
H2O = Water
LG = Large
MD = Physician
MTL = MTRL = Material
NA = Not Applicable
ND = NOT DET = Not Determined
NOT EST = Not Established
OC = Open Cup
PEL = Permissible Exposure Limits
P-M = Pensky-Martens
RESP= Respirator
SCBA= Self-Contained Breathing Apparatus
STEL= Short Term Exposure Limit
TWA = Time-Weighted Average

PMC 1601

W. H. Shurtleff Co.

1. IDENTIFICATION

MFG NAME: LCP Chemicals & Plastics Inc. EMER.TEL.NO:515-467-4700
ADDRESS: Raritan Plaza II,Raritan Center, Edison,N.J. 08837
CHEM. NAME & SYNS: caustic soda,liquid; sodium hydroxide, 50% liquid solution
TRADE NAME: Caustic Soda Liquid
CHEMICAL FAMILY: Alkali FORMULA: NaOH

2. PHYSICAL DATA

BOILING POINT:	280 to 310F	FREEZING POINT:	45 to 60F
MELTING POINT:			
SPECIFIC GRAVITY:	1.530 (H2O=1)	VAPOR PRESSURE:	2.2 mmhg @ 130F
VAPOR DENSITY:	na	SOLUBILITY IN WATER, % BY WT.:	Complete
PERCENT VOLATILES BY VOLUME:	~50%	EVAPORATION RATE:	
APPEARANCE AND ODOR:	:Colorless viscous liquid, No odor.		

3. INGREDIENTS

MATERIAL	%	TLV
CAS# 1310732		

EXPOSURE LIMIT INFORMATION

Reacts violently with acids.
Reacts with aluminum, tin, zinc, and generates flammable Hydrogen gas.
TWA 2 mg/cu.m. maximum acceptable concentration ceiling 2 mg/cu.m.

4. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: & METHOD USED: None

FLAMMABLE LIMITS
LOWER:na UPPER:na

EXTINGUISHING MEDIA: Suitable for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: This material is corrosive to all human tissue. Wear equipment to avoid body contact.

UNUSUAL FIRE & EXPLOSION HAZARDS: Caustic soda will react with metals like aluminum, tin and zinc that will generate flammable hydrogen gas.

5. HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE:
Inhalation:Sore throat, coughing,shortness of breath.
Skin:Corrosive, serious chemical and/or thermal burns.
Eyes:Corrosive:severe to permanent injury.
Ingestion:Corrosive, spasms, vomiting, tissue destruction.

FIRST AID PROCEDURES:
Mist inhalation:Remove from exposure. Get medical help.
Skin:Remove contaminated clothing. Continue prolonged washing with tempered water. Get medical help for burns.
Eyes:Prolonged washing with water. Get medical help.
Ingestion:Drink plenty of water or fruit juice. Do not induce vomiting. Get prompt medical help.

NOTES TO PHYSICIAN:

PMC 1601

6. REACTIVITY DATA

STABILITY
STABLE: X
UNSTABLE:

CONDITIONS TO AVOID:
Avoid contact with acids & metals like aluminum, tin, zinc.

INCOMPATIBILITY (MATERIALS TO AVOID): Organic chemicals, nitrocarbons & halocarbons; items mentioned above and alloys containing them.

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS: None.

HAZARDOUS POLYMERIZATION CONDITIONS TO AVOID: When exposed to air it will react to form Sodium Carbonate.Trichloroethylene will react to form dichloracetylene which is spontaneously flammable.

MAY OCCUR:
WILL NOT OCCUR:X

7. SPILL OR LEAK PROCEDURE

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Protective clothing and equipment must be worn by personnel. Contain spillage or leakage in suitable containers or contain in a holding area. Do not allow drainage to sewers,streams or storm conduits.Recover with vacuum equipment such as a septic tank truck or neutralize with weak acid solutions and flush with water. Avoid splashing and misting which could increase health hazards.

WASTE DISPOSAL METHOD Dispose of waste per company emergency contingency plan or in accordance with federal,state and local regulations. Waste is composed of neutral salts and water.

Reportable quantity:1000 lbs. Planning ahead is essential for handling spills. Abundant water, including eye baths and safety showers, should be available in the handling or storage areas.

8. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION:	None normally required however if "misting" is a possibility, a NIOSH approved particulate respirator should be worn.
VENTILATION:	Provide adequate ventilation to meet TLV requirements.
PROTECTIVE GLOVES:	Eye Protection: Splash goggles, face shield. Rubber, latex, or plastic gloves. Do not use leather or wool.
OTHER PROTECTIVE EQUIPMENT:	Rubber boots- top covered rubbers over leather shoes is not recommended. Rubber apron-rainwear or disposable Tyvek suits should be worn in splash areas. Hard hat. Eye wash stations and safety showers must be immediately available.

9. SPECIAL HANDLING INFORMATION

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:

Storage tanks should be contained in a diked area free of potential contact with acids, organics, and metals like aluminum, tin or zinc.
When mixing caustic soda & water, always add the caustic slowly and continuously, if possible, to the water (stirring) to minimize spattering from localized heat of dilution. DO NOT add water to the caustic.
Do not permit employees to handle caustic soda without advance training and proper protective equipment.
Abundant water must be available in handling areas.
Drains must have retention basins for neutralization before discharge.

OTHER PRECAUTIONS:

Storage tanks should be labeled with 4" lettering to avoid cross contamination of materials. Oversize vent is suggested for storage tanks in areas where freezing occurs.

Recommended materials of construction are nickel, stainless steel, lined steel, and where temperature limits and iron pick up is acceptable, plain carbon steel.

10. FURTHER INFORMATION

PMC1606

THE INDIUM CORPORATION OF AMERICA
1676 Lincoln Ave. • Utica, NY 13502
Emergency Telephone No. 315-797-1630

Material Safety Data Sheet

Common Name: Potassium Hydroxide Solution
KOH (45% - 52% Aqueous)

SECTION 1—HAZARDOUS INGREDIENTS/IDENTITY

Hazardous Component(s) (chemical and common name(s))	OSHA PEL	ACGIH TLV	% (optional)	CAS NO.
Potassium Hydroxide Solution	NA	2 mg/m3	100	1310583

SECTION 2—PHYSICAL AND CHEMICAL CHARACTERISTICS

Boiling Point	45% = 270F 50% = 292F	Specific Gravity (H_2O = 1)	45% = 1.450 50% = 1.520
Vapor Density (Air = 1)	NA	Vapor Pressure (mm Hg)	68F @ 2 mm Hg
Solubility in Water	Complete	Reactivity in Water	NA
Appearance and Odor	Colorless Viscous Liquid / No odor	Melting Point	NA

SECTION 3—FIRE AND EXPLOSION DATA

Flash Point: NA F. C. Method Used: NA Flammable Limits in Air % by Volume: LEL Lower NA UEL Upper NA

Auto-Ignition Temperature: NA Extinguisher Media: ☐ Foam ☐ "Alcohol" Foam ☐ CO_2 ☐ Dry Chemical ☐ Water Spray ☒ Other ☐ N.A.

Special Fire Fighting Procedures: Extinquishing media shall be suitable for surrounding fire. Use NIOSH/MSHA APPROVED SCBA and full protective clothing.

Unusual Fire and Explosion Hazards: This material is corrosive to all human tissue. It will react violently with many organic chemicals, especially nitrocarbons and chlorocarbons. Reacts with zinc, aluminum, tin and other active metals liberating flammable hydrogen gas.

SECTION 4—PHYSICAL HAZARDS (REACTIVITY DATA)

Stability: Unstable ☐ Stable ☒ Conditions to Avoid: Do not allow contact with acids and metals such as Aluminum, Zinc,

Incompatibility (Materials to Avoid): Tin, Organic chemicals, nitrocarbons, halocarbons and metals or alloys mentioned above.

Hazards Decomposition Products: Flammable hydrogen gas may be generated when KOH and certain metals react.

Hazardous Polymerization: May Occur ☐ Will Not Occur ☒ Conditions to Avoid: Exposure to air can form potassium carbonate

May be used to comply with OSHA's Hazard Communication Standard, 29CFR 1910. 1200. Standard must be consulted for specific requirements.

Date Prepared: 5/87

DAP

PMC1606

SECTION 5—HEALTH HAZARDS

1. Acute	Inhalation	Mist may cause injury to entire respiratory tract.
	Eyes	Will cause severe to permanent injury
	Skin	Will cause serious burns.
	Ingestion	Damages throat area and gastro - respiratory tract.
2. Chronic	Inhalation	No Data
	Eyes	No Data
	Skin	No Data
	Ingestion	No Data

Signs and Symptoms of Exposure: Serious burns to human tissue

Medical Conditions Generally Aggravated by Exposure: NO

Chemical Listed as Carcinogen or Potential Carcinogen — National Toxicology Program: Yes ☐ No ☒ — I.A.R.C. Monographs: Yes ☐ No ☒ — OSHA: Yes ☐ No ☒

Emergency and First-Aid Procedures: Inhalation: Remove from exposure, get medical help. Ingestion: Drink plenty of Water or fruit juice. Do not induce vomiting. Eyes: Flush for at least 15 minutes. Skin: Remove contaminated clothing and rinse skin with tempered water. In any case consult physician

SECTION 6—SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage: Storage tanks should be contained in a diked area that has sufficient capaci to hold the contents of the tank. This area should be free of potential contact with acid organics and reactive metals.

Steps to be Taken in Case Material is Released or Spilled: Wear full proective clothing. Contain spillage in suitable containers. Do not allow drainage to sewers, streams, or storm conduits. Neutralize with weak acid solutions and flush with water. Avoid splashing or misting.

Waste Disposal Methods (Consult federal, state, and local regulations): Dispose of in accordance with Federal, State, and local regulatio

SECTION 7—SPECIAL PROTECTION INFORMATION/CONTROL MEASURES

Respiratory Protection (Specify Type): NIOSH/MSHA approved respirator

Ventilation — Local Exhaust: Adequate ventilation is required to meet TLV requirements. — Mechanical (General):

Protective Gloves: Rubber, latex, plastic — Eye Protection: Splash proof goggles

Other Protective Clothing or Equipment: Coveralls, rubber boots. Rubbers over leather shoes is not recommended.

Work/Hygienic Practices:

SECTION 8—REFERENCES

Dangerous Properties of Industrial Materials; N. Irving Sax, '84
ACGIH TLV's; second printing
LCP Chemical and Plastics, Inc. Solvay, N.Y.

Potassium Hydroxide MSDS cont'd.

ADDITIONAL INFORMATION

Reportable spillage quantity is 1000 lbs or 454 kg. planning ahead is essential for handling spills. Proper equipment and trained employees should be readily available to correct a spill situation.

Safety eye wash/shower stations must be available in the work area.

Storage tanks should be labeled with 4" lettering to avoid cross contamination of materials. Oversized vents are suggested for storage tanks in climates where freezing occurs.

Recommended materials of construction are nickel, stainless steel, lined steel or Plain steel where temperature limits and iron pick up are acceptable.

SPECIAL PRECAUTIONS

When mixing KOH with water, always add the caustic slowly and continuously to the water, while stirring, to minimize spattering from localized heat of dilution. Do Not add water to the caustic.

Do not permit employees to handle without advanced training and proper protective equipment. Plenty of water should be available in the handling areas. Drains must have retention basins for neutralization before discharge to an outfall.

J.T. Baker Chemical Co.
222 Red School Lane Phillipsburg, N.J 08865
24-Hour Emergency Telephone - (201) 859-2151
Chemtrec # (800) 424-9300
National Response Center # (800) 424-8802

10 1606 UTCIHI (9)

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MATERIAL SAFETY DATA SHEET

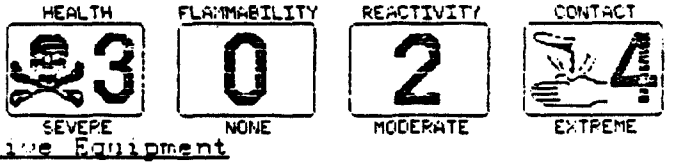
P5884 -01 Potassium Hydroxide Page:
Effective: 10/08/85 Issued: 10/08/

SECTION I - PRODUCT IDENTIFICATION

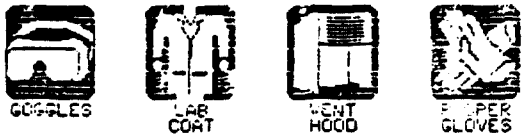
Product Name: Potassium Hydroxide
Formula: KOH
Formula Wt: 56.11
CAS No.: 01310-58-3
NIOSH/RTECS No.: TT2102000
Common Synonyms: Potassium Hydrate
Product Codes: 3141,3150,3146,3147,5342,3142,3140,5085

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA™ System



Laboratory Protective Equipment



Precautionary Label Statements

POISON! DANGER!
CAUSES SEVERE BURNS
MAY BE FATAL IF SWALLOWED

Do not get in eyes, on skin, on clothing.
Avoid breathing dust. Keep in tightly closed container. Use with adequate ventilation. Wash thoroughly after handling.

SECTION II - HAZARDOUS COMPONENTS

Component	%	CAS No
Potassium Hydroxide	85-100	1310-58-3

SECTION III - PHYSICAL DATA

Boiling Point: 1320°C (2408°F) Vapor Pressure(mmHg): N/A

Melting Point: 360°C (680°F) Vapor Density(air=1): N/A

Continued on Page: 2

SECTION III - PHYSICAL DATA (Continued)

Specific Gravity: 2.04 (H_2O=1)

Evaporation Rate: N/A (Butyl Acetate=1)

Solubility(H_2O): Complete (in all proportions)

% Volatiles by Volume: 0

Appearance & Odor: White or slightly yellow pellets; no odor.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: N/A

NFPA 704M Rating: 3-0-1

Fire Extinguishing Media

Use water spray.

Special Fire-Fighting Procedures

Firefighters should wear proper protective equipment and self-contained breathing apparatus with full facepiece operated in positive pressure mode.

SECTION V - HEALTH HAZARD DATA

Threshold Limit Value (TLV/TWA): 2 mg/m^3 (ppm)

Effects of Overexposure

Contact with skin or eyes may cause severe irritation or burns.
Excessive inhalation of dust is irritating and may be severely damaging to respiratory passages and/or lungs.
Ingestion may cause severe burning to mouth and stomach.

Emergency and First Aid Procedures

If swallowed, do NOT induce vomiting; if conscious, give large amounts of water. Follow with diluted vinegar, fruit juice or whites of eggs, beaten with water.
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Wash clothing before re-use.

SECTION VI - REACTIVITY DATA

Stability: Stable

Hazardous Polymerization: Will not occur

Conditions to Avoid: moisture

Incompatibles: water, strong acids, organic materials

Continued on Page: 3

SECTION VII - SPILL AND DISPOSAL PROCEDURES

Steps to be taken in the event of a spill or discharge

Wear self-contained breathing apparatus and full protective clothing. With clean shovel, carefully place material into clean, dry container and cover; remove from area. Flush spill area with water.

J. T. Baker Neutracit-2^{R} caustic neutralizer is recommended for spills of this product.

Disposal Procedure

Dispose in accordance with all applicable federal, state, and local environmental regulations.

EPA Hazardous Waste Number: D002, D003 (Corrosive, Reactive Waste)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

Ventilation:	Use general or local exhaust ventilation to meet TLV requirements.
Respiratory Protection:	None required where adequate ventilation conditions exist. If airborne concentration is high, a dust/mist respirator is recommended. If concentration exceeds capacity of respirator, a self-contained breathing apparatus is advised.
Eye/Skin Protection:	Safety goggles, uniform, apron, neoprene gloves are recommended.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA^{TM} Storage Color Code: White Stripe

Special Precautions

Keep container tightly closed. Store in corrosion-proof area.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

Proper Shipping Name	Potassium hydroxide, dry solid
Hazard Class	Corrosive material (solid)
UN/NA	UN1813
Labels	CORROSIVE
Reportable Quantity	1000 LBS.

INTERNATIONAL (I.M.O.)

Proper Shipping Name	Potassium hydroxide, dry solid

Continued on Page: 4

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (Continued)

Hazard Class	8
UN/NA	UN1813
Labels	CORROSIVE

N/A = Not Applicable or Not Available

The information published in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the user's responsibility to determine the suitability of this information for the adoption of necessary safety precautions. We reserve the right to revise Material Safety Data Sheets periodically as new information becomes available.

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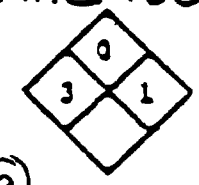
PMC 1606

hooker PROCESS chemicals



ADAPTED FROM USCG FORM NO. CG-[illegible]

MATERIAL SAFETY DATA SHEET

UTCIHL (9)

NFPA Designation

CHEMICAL NAME.		PLANT CODE	MATERIAL CODE NO.
Potassium Hydroxide, Flake			
MANUFACTURER'S NAME		EMERGENCY TELEPHONE NO.	
Hooker Chemicals & Plastics Corp.		(716) - 278-7777	
ADDRESS (NUMBER, STREET, CITY, STATE AND ZIP CODE)			
Buffalo Avenue, Niagara Falls, New York 14303			
CHEMICAL NAME AND SYNONYMS		TRADE NAME	
Potassium Hydroxide, Potassium Hydrate		Caustic Potash, Flake	
CHEMICAL FORMULA	MOL. WT.	USES	
KOH	56.1	Soap, Glass, Textiles, Pharmaceuticals	

Physical Properties

BOILING POINT (°F)	2400°	SPECIFIC GRAVITY (H_2O = 1)	2.044
VAPOR PRESSURE (mm Hg)	--	PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)	--	EVAPORATION RATE (=1)	
SOLUBILITY IN WATER @ 68°F	52%		

APPEARANCE AND ODOR: Off-white, hygroscopic solid with no odor

Fire and Explosion Hazard Data

FLASH POINT	METHOD	FLAMMABLE LIMITS	AUTOIGNITION TEMP.
none °F		UEL -- LEL --	none °F

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES: As appropriate for surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Hot or molten material will react violently with water liberating heat and causing splashing.

Reactivity

INCOMPATIBILITY: Reacts with zinc, aluminum, lead, etc. liberating flammable hydrogen; can react violently with many organic compounds.

HAZARDOUS DECOMPOSITION PRODUCTS: --

CONDITIONS TO AVOID: Wear protective equipment to avoid contact with body or inhalation of mist or dust. In processes, control rates of addition to control temperature and avoid violent reactions.

PMC 1606

Potassium Hydroxide, Flake (Cont'd.)

Health Related Data

THRESHOLD LIMIT VALUE (as KOH) C: 2 mg/cu meter of air.

EFFECTS OF OVEREXPOSURE (SKIN, EYE, INHALATION, ETC.) Caustic Potash is a primary irritant. Solid caustic and concentrated solutions are destructive to tissues and cause serious burns. Contact with any form may cause severe damage to eyes. Inhalation of dust or mist can cause injury to the entire respiratory tract. In case of dilute solutions, symptoms of irritation may not be apparent until some time has passed.

EMERGENCY AND FIRST AID PROCEDURES For external exposures, flush with large amounts of water -- speed of removal of caustic potash is of prime importance. If taken internally, dilute by drinking water or milk - do not induce vomiting. If inhaled, remove to clean atmosphere. For all eye exposures and serious over-exposures, get medical attention.

SPECIAL MEDICAL PROCEDURES For skin exposures, avoid salves or ointments for at least 24 hours. After first 15 minutes of flushing with water, a few drops of pontocaine solution may be instilled in eyes. In case of ingestion, following dilution, fruit juice or dilute vinegar may be administered to neutralize caustic.

Special Protection Information

VENTILATION As required to control dust or mist.

RESPIRATORY (TYPE) Filter or dust type.

GLOVES (TYPE) Rubber, neoprene or vinyl.

EYE (TYPE) Fitted chemical safety goggles.

OTHER Rubber safety toe shoes or boots, cotton coveralls, hard hat.

SPECIAL PRECAUTIONS FOR HANDLING AND STORAGE Store in a cool, dry place. Keep separate from acids, metals, explosives, organic peroxides and easily ignitible materials. Wear complete protective equipment in handling product.

STEPS TO TAKE IN EVENT OF SPILL OR RELEASE Get complete protective equipment, sweep up and place material in metal can. Flush area with ample water, rinse with diluted acetic or muriatic acid, and then finally with water.

WASTE DISPOSAL Dissolve and/or flush to retention area for pH adjustment and dilution before discharging to stream or sewer system.

REMARKS Caustic Potash and Trichlorethylene are especially hazardous since they react to form spontaneously flammable dichloroacetylene.

REFERENCES (1) MCA Safety Data Sheet SD-10; Caustic Potash; (2) Sax, N I, Dangerous Properties of Industrial Materials, 3rd Edition, 1968.

Process Chemicals Technical Data Sheet 791 C.

NAME G W Darling

LOC. Niagara

DATE January 1972
Revised April 1980

Part Hydrosphere

PMC 1606-1

CAUSTIC POTASH, STANDARD GRADE - Data Sheet No. 730-B

DESCRIPTION

Hooker Standard Grade Caustic Potash (potassium hydroxide) is available from the Eastern Chemical Division as a solution containing 45-50% KOH by weight, in flake, granular, and in several other dry forms.

For further information on physical properties and handling and storage recommendations, write to Hooker Technical Service Department.

CHEMICAL SPECIFICATIONS

	Liquid	Flake/Granular
Equivalent KOH	45.0-50.0%	90.0% min
NaOH	0.04% max	0.10% max
K_2CO_3	0.2% max	1.0% max
KCl as Cl	0.35% max	0.65% max
$KClO_3$	0.0006% max	None
K_2SO_4	0.002% max	0.006% max
Fe	0.0005% max	0.003% max
Si	0.001% max	0.002% max
Ca	0.0005% max	0.001% max
Mg	0.0005% max	0.001% max

Other dry forms available include Walnut, Broken, Powder, Crushed, and Solid.

PHYSICAL PROPERTIES

Molecular Weight		56.1
Melting point	45%	-22°F
	50%	48°F
	90%	427°F
	Anhydrous	716°F
Weight per Gallon	45%	12.18 pounds
	50%	12.68 pounds

IMC CHEMICAL GROUP, INC.

PMC 1606-1

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MAY 18 '82

specification: POTASSIUM HYDROXIDE - FLAKE KOH

GRADE:

Mercury Cell, 90% KOH minimum

SPECIFICATION:

Element	Minimum	Maximum
KOH	90.00%	91.5 %
K_2CO_3		0.8 %
NaOH		0.45%
KCl		100 ppm
Fe		10 ppm
SiO_2		40 ppm
$KClO_3$		1 ppm
Ca		5 ppm
K_2SO_4		20 ppm
Hg		0.02 ppm
Mg		5 ppm

DESCRIPTION:

Chalk White in color

Molecular Weight:	56.1
Bulk Density:	Approx. 65 lb./cu. ft.
Melting Point:	90% 219° C
	Anhydrous 380° C

PMC 1606-1

USES

Caustic potash is a strong alkali which readily combines with many substances. Because of the difference in properties between potassium compounds and the corresponding sodium compound, caustic potash has many uses not suited to the cheaper caustic soda. Some of the industries requiring caustic potash are: soap, glass, textile, pharmaceuticals, dyes, cosmetics, organic and inorganic potassium compounds, perfumes and essential oils, oil refining, electroplating, alkaline storage batteries, and other industries and processes.

PRECAUTIONARY INFORMATION

The following precautions for handling caustic potash are quoted from our drum label. This warning label has been prepared in accordance with a pattern established by the Manufacturing Chemists' Association.

"DANGER! CAUSTIC POTASH IS CORROSIVE.
BURNS SKIN AND EYES.

Avoid contact with body or clothing. Do not take internally.

PRECAUTIONS: When handling Caustic Potash wear goggles or face shield and avoid all contact with skin. While making solutions, add Caustic Potash slowly to surface of solution to avoid violent spattering.

In case of accidental contact with skin, immediately flush affected parts with water and wash with vinegar.

For eyes, flush freely with water for at least 15 minutes and get medical attention. See MCA Data Sheet SD-1."

UTC TITLE WHITE
(R) 3/28/78

PMC 1643
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SEP 2 1980

U. S. DEPARTMENT OF LABOR
WAGE AND LABOR STANDARDS ADMINISTRATION
Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

G. E. PARSONS
Code: 16583

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
MACDERMID, INC.	203-754-6161
ADDRESS (Number, Street, City, State, and ZIP Code)	
526 HUNTINGDON AVENUE, WATERBURY, CONNECTICUT 06720	
CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
	Metex CT-2 Bright Copper Maint.
CHEMICAL FAMILY	FORMULA

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS N.A.			BASE METAL N.A.		
CATALYST "			ALLOYS "		
VEHICLE "			METALLIC COATINGS "		
SOLVENTS "			FILLER METAL PLUS COATING OR CORE FLUX "		
ADDITIVES "			OTHERS "		
OTHERS "					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Potassium Cyanide	2	5mg/M^3
Copper Cyanide	1	5mg/M^3
Selenium Less Than	1	0.1mg/M^3

SECTION III PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	1.02
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR	Colorless solution		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None	None		
EXTINGUISHING MEDIA			
SPECIAL FIRE FIGHTING PROCEDURES			
UNUSUAL FIRE AND EXPLOSION HAZARDS			

PMC 1643

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

See Section II

EFFECTS OF OVEREXPOSURE

Can cause skin irritation

EMERGENCY AND FIRST AID PROCEDURES

Eyes - Flush with water for 15 minutes. Contact doctor.

Skin - Flush with water.

Internal - Treat as for cyanide. Get immediate medical aid

SECTION VI REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	X	

INCOMPATABILITY (Materials to avoid)

Acids or acidic materials

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Flush with water to drain.

WASTE DISPOSAL METHOD

Treat as for cyanides and selenium.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

VENTILATION		
	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General) X	OTHER

PROTECTIVE GLOVES	EYE PROTECTION
Rubber	Face shield

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep away from acids

OTHER PRECAUTIONS

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1658 2

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WAGE AND LABOR STANDARDS ADMINISTRATION

Bureau of Labor Standards

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
MACDERMID, INC.	203-754-6161

ADDRESS (Number, Street, City, State, and ZIP Code)
526 HUNTINGDON AVENUE, WATERBURY, CONNECTICUT 06720

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
	Metex CT Bright Copper Maintenanc

CHEMICAL FAMILY	FORMULA

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS N.A.			BASE METAL N.A.		
CATALYST "			ALLOYS "		
VEHICLE "			METALLIC COATINGS "		
SOLVENTS "			FILLER METAL " PLUS COATING OR CORE FLUX		
ADDITIVES "			OTHERS "		
OTHERS "					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Potassium Cyanide	2	5mg/M
Copper Cyanide	1	5mg/M
Selenium Less Than	1	0.1mg

SECTION III PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	1.02
VAPOR PRESSURE (mm Hg.)		PERCENT VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____=1)	
SOLUBILITY IN WATER			

APPEARANCE AND ODOR Colorless solution

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	LEL	UEL
None	None		

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES

UNUSUAL FIRE AND EXPLOSION HAZARDS

PMC 1644

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

See Section II

EFFECTS OF OVEREXPOSURE

Can cause skin irritation

EMERGENCY AND FIRST AID PROCEDURES

Eyes - Flush with water for 15 minutes. Contact doctor.

Skin - Flush with water.

Internal - Treat as for cyanide. Get immediate medical aid

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY (Materials to avoid)

Acids or acidic materials

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Flush with water to drain.

WASTE DISPOSAL METHOD

Treat as for cyanides and selenium.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL (General) X	OTHER

PROTECTIVE GLOVES Rubber	EYE PROTECTION Face shield

OTHER PROTECTIVE EQUIPMENT

Rubber apron

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Keep away from acids

OTHER PRECAUTIONS

16582

R-48 PMC 176

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Occupational Safety and Health Administration

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OMB No. 44-R1387

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MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

MAY 18 '82 1746

SECTION I

MANUFACTURER'S NAME	EMERGENCY TELEPHONE NO.
KOCOUR CO.	(312) 847-1111

ADDRESS (Number, Street, City, State, and ZIP Code): 4800 S. ST. LOUIS AVE. CHICAGO, IL. 60632

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
Sodium Thiocyanate	Solution R-48

CHEMICAL FAMILY	FORMULA
	Aqueous solution 12%

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)		SPECIFIC GRAVITY (H_2O=1)	
VAPOR PRESSURE (mm Hg.)		PERCENT, VOLATILE BY VOLUME (%)	
VAPOR DENSITY (AIR=1)		EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER			
APPEARANCE AND ODOR			

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel

EXTINGUISHING MEDIA
SPECIAL FIRE FIGHTING PROCEDURES
UNUSUAL FIRE AND EXPLOSION HAZARDS

(Continued on reverse side)

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PMC 1764 MAY 18 '82 1746

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

EFFECTS OF OVEREXPOSURE

non-hazardous

EMERGENCY AND FIRST AID PROCEDURES

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE		

INCOMPATABILITY *(Materials to avoid)*

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR		

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

WASTE DISPOSAL METHOD

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*

VENTILATION	LOCAL EXHAUST	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES	EYE PROTECTION

OTHER PROTECTIVE EQUIPMENT

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

OTHER PRECAUTIONS

non-hazardous

PMC 1778

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Rec'd 6-5-74

older info in file

SECTION I

MANUFACTURER'S NAME: Enthone, Inc.	EMERGENCY TELEPHONE NO.: 203-934-8611
ADDRESS (Number, Street, City, State, and ZIP Code): Box 1900 New Haven, Conn - 06508	
CHEMICAL NAME AND SYNONYMS: N.A.	TRADE NAME AND SYNONYMS: Enthobrite Cadmium Concentrate
CHEMICAL FAMILY: N.A.	FORMULA: N.A.

MAY 18 82

1746

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Cadmium	19.5	0.2 mg/M³
Sodium Cyanide	27.5	5 mg./M³

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	232°F	SPECIFIC GRAVITY (H_2O=1)	1.34
VAPOR PRESSURE (mm Hg.)	—	PERCENT, VOLATILE BY VOLUME (%)	—
VAPOR DENSITY (AIR=1)	—	EVAPORATION RATE (_____=1)	—
SOLUBILITY IN WATER	Soluble		

APPEARANCE AND ODOR: Very light yellow liquid with no significant odor

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	FLAMMABLE LIMITS	Lel	Uel
None			

EXTINGUISHING MEDIA: In a fire — Water, CO_2, Foam

SPECIAL FIRE FIGHTING PROCEDURES: Avoid contact with acids. Contact with acid will produce highly toxic HCN fumes

UNUSUAL FIRE AND EXPLOSION HAZARDS: —

(Continued on reverse side)

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Enthobrite Cd. Conc.

MAY 18 '82 1746

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: N.A.

EFFECTS OF OVEREXPOSURE: Irritation and possible systemic toxicity

EMERGENCY AND FIRST AID PROCEDURES: External - Wash with much water; report to doctor. Internal - Amyl Nitrite by inhalation, artificial respiration if breathing has stopped; then, swallow egg whites or milk; call physician

SECTION VI - REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		A A
	STABLE Shelf life:	11 yr.	A A

INCOMPATABILITY (Materials to avoid): Air, oxidizers, acids (form HCN fumes)

HAZARDOUS DECOMPOSITION PRODUCTS: In a fire - HCN, Cyanogen, toxic cadmium compounds.

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	✓	

PNC 1778

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: For small amount (less than 1 QT.), flush away with copious amount of water; but, avoid acid drain. For larger amounts, treat to oxidize and destroy cyanide.

WASTE DISPOSAL METHOD: Treat to oxidize and destroy cyanide and to precipitate cadmium.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type): Type for poisonous fumes (CL, CN)

VENTILATION			
	LOCAL EXHAUST: Yes	SPECIAL: —	
	MECHANICAL (General): —	OTHER: —	

PROTECTIVE GLOVES: yes, rubber

EYE PROTECTION: yes, Face Shield

OTHER PROTECTIVE EQUIPMENT: boots

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store indoor at max. of 110°F and min. of 0°F. Avoid skin contact. Avoid contact with acids.

OTHER PRECAUTIONS: Will generate toxic gas in acid solution

GPO 934-180

Form OSHA-20
Rev. May 72

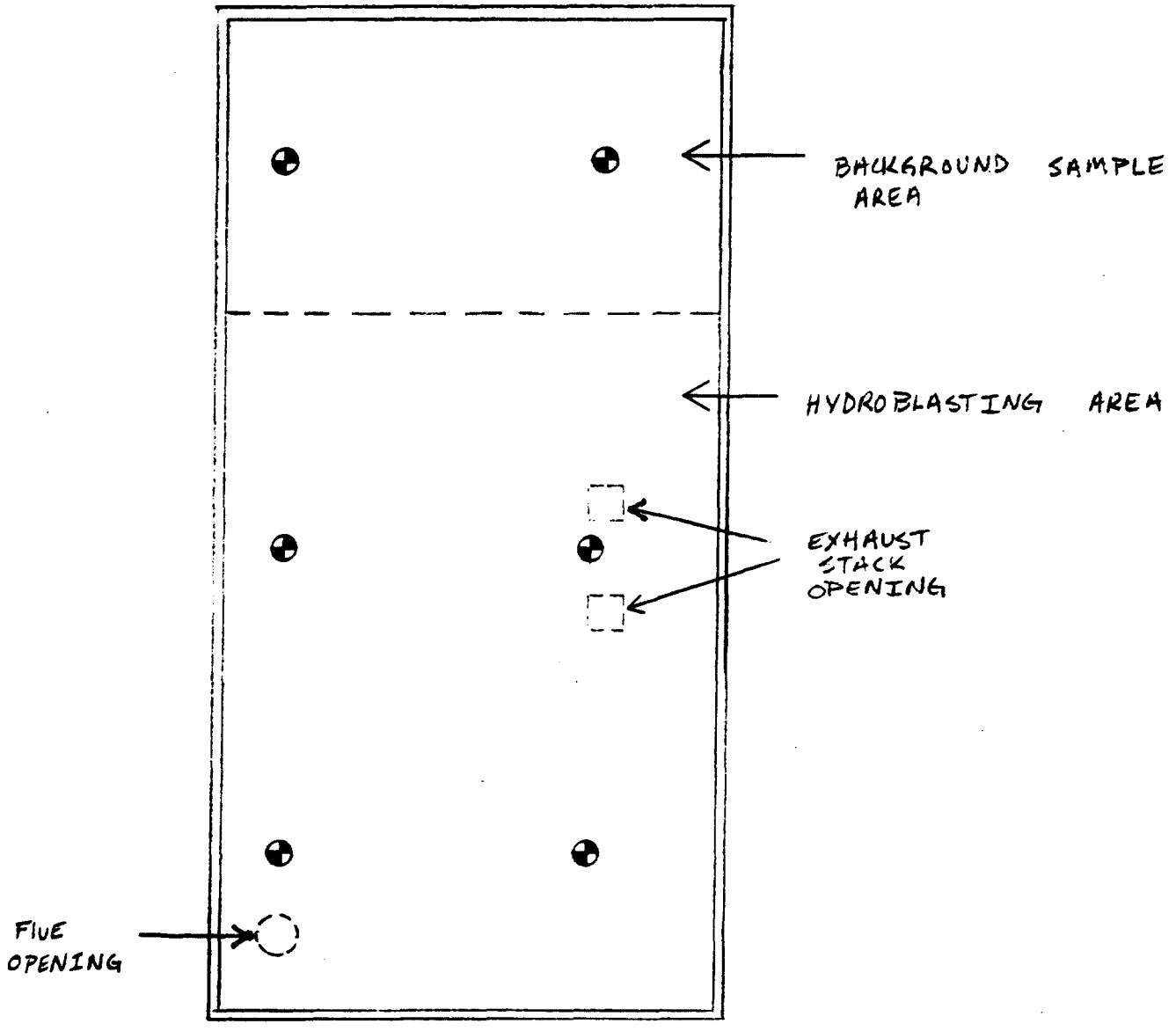
ATTACHMENT C

CEILING WIPE SAMPLE LOCATION MAP

PWA FORM 3826 REV. 2/70

UNITED TECHNOLOGIES PRATT & WHITNEY AIRCRAFT

MODEL		TITLE ATTACHMENT C		BY	SLS
FILE		CEILING WIPE SAMPLE LOCATION MAP		DATE	3/15/89
JOB				PAGE	1 OF 1



⊕ CEILING WIPE SAMPLE LOCATION

UNITED TECHNOLOGIES PRATT&WHITNEY

400 Main Street
East Hartford, Connecticut 06108

July 28, 1989

Mr. George Dews
Senior Sanitary Engineer
Hazardous Waste Management Section
Department of Environmental Protection
165 Capitol Avenue
Hartford, CT 06106

Mr. Stephen Yee
Environmental Engineer
Waste Management Division
US EPA
90 Canal Street - 3rd floor
Boston, MA 02114

Re: Revised Burn-Zol Hazardous Waste Incinerator Closure Plan
UTC - Pratt & Whitney East Hartford, CT
EPA ID # CT D 990672081

Dear Sirs:

Pratt & Whitney is pleased to submit a revised closure plan for the Burn-Zol hazardous waste incinerator located at our facility in East Hartford, CT. This plan represents our efforts following the latest round of agency comments received in a joint letter from EPA Region I and the Connecticut Department of Environmental Protection dated April 27, 1989.

We are eager to begin closure activities upon closure plan approval and respectfully request a timely review. Please contact Scott Singer at (203) 565-2016 with any questions or comments.

Sincerely,

John G. Whitehead
Plant Manager

JGW/SLS/bab

s-s3i

CLOSURE PLAN
FOR THE BURN-ZOL
HAZARDOUS WASTE INCINERATOR

Resource Conservation and Recovery Act

Concentrated Waste Treatment Plant

Pratt & Whitney

400 Main Street Facility

East Hartford, Connecticut

EPA ID #CT D 990672081

July 28, 1989

TABLE OF CONTENTS

APPENDIX

HAZARDOUS WASTE INCINERATOR CLOSURE PLAN

1.0 INTRODUCTION

This closure plan is for the hazardous waste incinerator located at the Concentrated Waste Treatment Plant of United Technologies - Pratt & Whitney East Hartford facility, EPA ID No. CT D 990672081. Closure of this unit will be conducted in accordance with all applicable RCRA regulations, and will:

1) Minimize the need for further maintenance, and;

2) Control, minimize or eliminate to the extent necessary to protect human health and the environment, the post closure escape of hazardous waste, hazardous constituents, leachate, or contaminated run-off to the groundwater, surface water or the atmosphere.

In subsequent sections, this closure plan provides a description of methods to be applied and precautions to be taken in closing the incinerator. Specific closure activities are described in detail and a trackable closure schedule and cost estimate are provided.

The following general information applies to this plan:

1) Personal Health and Safety
A specific Site Health and Safety Plan has been developed for all closure activities and is included as Appendix A. The decontamination crew will consist of a minimum of two individuals at all times who will be adequately trained and familiar with the elements of the Health and Safety Plan. Supervision of all closure activities will include the supervisor(s) of the decontamination crew and members of Pratt & Whitney's Environmental Protection Group.

2) Sudden or Non-Sudden Release
The activities associated with incinerator closure present a moderate risk potential for the release of hazardous waste. In the event of an unplanned release of hazardous waste, emergency response procedures outlined in Pratt & Whitney's Environmental Compliance Manual will be activated.

2.0 FACILITY DESCRIPTION

The Concentrated Waste Treatment Plant (CWTP) functions as the hazardous waste treatment and storage facility at the Pratt & Whitney East Hartford plant. Hazardous wastes are transported to the CWTP from areas within the East Hartford plant and from Pratt & Whitney satellite plants located in Connecticut, Maine and New York.

As specified on the RCRA Part A application, the CWTP consists of a hazardous waste barrel storage area, a concentrated waste water treatment building and a liquid injection hazardous waste incinerator. These operations are located in an area near the

northern end of the East Hartford plant complex. (Appendix B, Figure 1).

The CWTP incinerator has not operated since the last of four test burns dated May 30, 1984. This is the only equipment at the CWTP that will undergo closure as described in this plan.

3.0 INCINERATOR DESCRIPTION

Incinerator operations at the CWTP include the incinerator and the associated waste feed lines. In later sections of the closure plan the incinerator will be referred to as the incinerator train.

The incinerator train encompasses the entire incineration process from the initial liquid waste injection nozzles to and including the exhaust stacks. Specific incinerator train components include: the waste injection nozzles, the primary and secondary combustion chambers, the lined flue piping, the waste heat boiler and heat exchanger, the unlined flue piping and the air pollution control equipment.

The original layout of the incinerator train and waste feed lines is presented in Appendix B, Figure 2. Only the initial combustion unit and the exhaust stacks are located outside of the building. Appendix B, Figure 3 depicts the current incinerator train and waste feed line layout. In 1988, the lined flue piping, the waste heat boiler, the unlined flue piping and a portion of the air pollution control were removed from the incinerator train. These components were then moved to a storage area north of the building and a dedicated enclosure was constructed.

A total of four different waste types were originally proposed for incineration; blended oils, zyglo solution, cyanide solution and a wax/solvent mixture. Four waste feed lines were installed to feed the incinerator train. Three of the feed lines are underground and originate in the basement of the barrel storage building. The fourth line was above ground and originated from within the incinerator building. As depicted in Appendix B, Figure 2, line #1 was designed to transfer two waste streams; the cyanide and zyglo solutions. Lines #2 and #3 were designed to carry blended oils. Line #4, the wax/solvent line, originated directly from the wax/solvent tank located in the incinerator building.

A generalized diagram of the incinerator train is presented in Appendix B, Figure 4. Below is a narrative description of the specific incinerator train components.

The initial waste combustion unit is identified as a Burn-Zol Model 272 liquid injection incinerator. This unit is cylindrical in shape with a height of twenty one feet three inches and an outer diameter of six feet six inches. Between the outer stainless steel shell and the inner steel shell are 3 inches of forced air cooling. In

addition, there are six inches of high temperature, acid resistant refactory lining inside the unit. The incinerator is subdivided into primary and secondary combustion chambers and a tertiary holding chamber. Each chamber is five feet in diameter and the combined area totals 19.5 square feet.

The primary chamber has two (2) dual fuel Maxon 3" Multifire II burners rated at 1.5 Million British Thermal Units per hour (MM BTU/hr) each. The burners will function using either natural gas or No. 2 oil as a fuel source. The secondary chamber has one (1) dual fuel Maxon 4" Multifire II burner rated at 2.5 MM BTU/hour. All burners have Protectifier flame safeties on the pilots and a 20:1 throttleable and proportional control.

A total of three liquid injection nozzles are located on the primary combustion chamber. Each nozzle was designed to handle specific waste(s) and they are identified as numbers 1, 2 and 3 (Appendix B, Figure 2). Nozzle #1 was dedicated for the wax/solvent mixture. Nozzle #2 was dedicated for the cyanide or zyglo solutions. Nozzle #3 was dedicated for the blended oils waste stream.

Combustion products from the incinerator are ducted in refractory lined flue piping to an Eclipse Model 3 HRW waste heat boiler which generates hot water. A pitot tube with indicator is located in the duct to indicate combustion gas velocity. Generated hot water is cooled in a tube and shell heat exchanger with the cooling water being diverted to a NPDES permitted cooling water discharge.

From the waste heat boiler, combustion products are then ducted in unlined flue piping to a Hydronics Model VS 72 venturi scrubber and a Hydronics Model PTS 72 packed tower counterflow scrubber operating with caustic wash. Both scrubbers are fabricated of stainless steel and the tower contains polypropylene Tellerette packing. To protect the packing there is a thermocouple and temperature switch in the inlet duct that will shut down the incinerator before the packing has any thermal damage. There is also a liquid manometer across the venturi scrubber to indicate pressure drop. The pressure drop is used as an indication of air velocity and scrubber efficiency. The venturi scrubber is designed for particulate removal while the packed tower has high gas/liquid area for removing fine particulate and neutralizing acids in the waste gas stream. At the exit of the scrubbers is a demister system to remove liquid entrainment in the waste gas stream. The caustic wash is contained in a 400 gallon tank and circulated through the scrubbers at 65 gallons per minute (gpm). The pH is controlled at 7.0-8.5 by the addition of liquid sodium hydroxide.

The air from the demisters is ducted through a damper system to one of two prime air movers. These air movers are New York Blower Series 45 G1 fans, size 264 with 60 horse-power motors rated at 4000 cubic feet per minute (cfm) at 37" water. One blower is the prime mover with the second used as a back-up.

The exhaust system operates as an induced draft system, indicating the entire system operates under constant negative pressure conditions. As such, air is only pulled into the ducts, as opposed to forced emissions from the ductwork to the exhaust stack.

4.0 PERMITTING HISTORY

On September 19, 1979 Pratt & Whitney submitted an application to the Connecticut Department of Environmental Protection (DEP) Air Compliance Unit to construct a liquid injection hazardous waste incinerator. The permit to construct was granted on August 9, 1980 and construction commenced immediately. The construction was essentially complete in April 1981. Following construction, a series of test burns were conducted at various times to define the operating performance of the unit compared to the DEP regulatory standards. As described in the following section, these performance tests indicated excessive particulate emissions, and the required Construction and Operation permits from the DEP Air Compliance Unit expired while these problems were being investigated. Renewals of these permits were requested and received from the DEP on numerous occasions, as each test burn identified additional performance deficiencies that required further investigation.

As indicated in Section 2.0 the incinerator is included in the RCRA Part A application. The incinerator was also included in the original Part B Permit Application submitted to the DEP in April 1983. Subsequent revisions to this application included updated information on the incinerator and the proposed trial burn plan. The DEP issued Pratt & Whitney the most recent Notice of Deficiency (NOD) on this permit application in October, 1985. Included in this NOD were requests for additional incinerator information. In response, a decision was made to close the incinerator and remove the reference to this unit from the Part B Permit Application.

5.0 TEST BURN HISTORY

A total of four test burns were conducted on the incinerator in an attempt to comply with DEP emission standards. Only the cyanide and the wax/solvent waste streams were used during the test burns. The following is a summary of each test burn and the equipment modifications made following each test burn.

The first test burn was conducted on March 30 and 31, 1982. Both the cyanide and wax/solvent waste streams were tested. The cyanide solution was tested on 3/30/82 over three test runs, approximately one hour in duration each. The waste feed rate averaged 47 gallons per hour (gph) and the total volume of waste burned was approximately 157 gallons. The wax/solvent waste was tested on 3/31/82. Again, three test runs were conducted approximately one hour in duration each. The average waste feed rate was approximately 36 gph and the total volume of waste burned was approximately 136 gallons.

In addition to testing incineration emissions, incoming liquid waste samples were collected for both the cyanide and wax/solvent waste streams. Each sample was collected over a 10 minute period from the valve and drain port located in the feed line close to the respective injection nozzle. The analytical results for these samples are presented in Appendix C.

The test burn indicated that the incinerator was unable to meet DEP requirements for particulate emissions. The following equipment modifications were made prior to the next test.

- New injector nozzles were installed to increase waste atomization.
- New burner controls were installed.

A second test burn was conducted on December 14, 1982. Both the cyanide and wax/solvent waste streams were tested on this date with one test run for each easte. The wax/solvent mixture was tested first at a waste feed rate of approximately 49 gph. Approximately 51 gallons were burned. The cyanide waste was tested at a waste feed rate greater than 30 gph. The total amount of cyanide solution burned was greater than 32 gallons.

Test burn results indicated that particulate emissions still exceeded DEP requirements. Over the next 12 months the following system modifications were made:

- A mist eliminator was added to the system
- An insulated exhaust stack was added
- Adjustments were made to the system scrubber and flow meter.

The third test burn was performed on December 12 and 13, 1983. The wax/solvent mixture and cyanide solution were tested on 12/12/83 and 12/13/83 respectively. Similar to the first test burn, each waste was tested over three runs of approximately one hour for each run. The waste feed rates ranged from 41-51 gph for the wax/solvent mixture and 48-50 gph for the cyanide solution. Total volumes ranged from 164-205 gallons for the wax/solvent waste and 187-194 gallons for the cyanide waste.

Again, the incinerator could not meet the DEP requirements for particulate emissions. In early 1984 the consulting engineering firm retained for incineration installation and test burns #1-3 was disengaged. Shortly thereafter, another consulting firm was retained to examine the incinerator train and investigate engineering alternatives to bring the incinerator into regulatory compliance.

The fourth and final test was conducted on May 30, 1984. This test was designed as a diagnostic test to determine the cause of suspected operating deficiencies in the incinerator. The wax/solvent solution was the only waste stream tested in a single test run that spanned

nearly five hours. The waste feed rate during the test burn averaged 30 gph with a total waste volume of approximately 150 gallons.

Investigation of the test burn data resulted in noting operating deficiencies in several areas; however, the deficiencies centered on poor combustion chamber operation and inadequate scrubber performance. The synergistic effects of all deficiencies resulted in a recommendation that significant equipment add-ons would be necessary to bring the incinerator into regulatory compliance.

A decision was made in the first quarter of 1985 to postpone pursuing an incinerator modification program and the accompanying test burn. By the fall of 1985 Pratt & Whitney decided to abandon the incinerator permitting process and began pursuing incinerator closure alternatives.

6.0 REFRACTORY SAMPLING HISTORY

Following the decision to pursue closure of the incinerator train (fall 1985), environmental sampling was performed on various incinerator train components. The analytical results from this sampling program were intended to serve as the basis for determining the appropriate disposal alternative.

The sampling effort was conducted in mid 1986 and focussed on the refractory lining in the primary and secondary combustion chambers, the tertiary holding chamber, the lined flue piping and the waste heat boiler. A total of 26 discrete sample locations were identified based on visual observations of staining or discoloration. Refer to Appendix D for a diagramatical and narrative description of each sample location. Samples were collected by scraping the refractory at each location with a small knife. Collected samples were then composited based on their respective location along the incinerator train.

A total of nine samples were submitted for laboratory analysis. Requested analytical parameters include volatile organic compounds, EP toxicity metals, cyanide and pH. The resulting data indicated non-detectable levels of volatile organic compounds and cyanide for all submitted samples. In addition, all samples submitted for EP toxicity metals analyses yielded constituent concentrations below hazardous levels with the exception of the sample submitted from the primary combustion chamber. This sample exhibited the characteristic of EP toxicity for the metal constituent chromium (46.4 ppm). A summary of all EP toxicity metals results and the copies of the laboratory data sheets are included in Appendix D.

7.0 CLOSURE PROCEDURES AND SCHEDULE

As mentioned in Section 2.0, the incinerator has not operated since the last test burn dated May 30, 1984. These four test burns were not long enough to produce significant amounts of hazardous waste

residue (ash); consequently, there are no storage tanks or structures at the CWTP dedicated to holding wastes from the incinerator. As such, there will be no need to discuss the operating procedures of the incinerator during closure activities.

The building housing a portion of the incinerator train is currently used for other hazardous waste activities (Appendix B, Figure 3). At present, these activities include limited drum storage, equipment storage and bulk liquid hazardous waste storage under RCRA interim status. As stated in Section 2.0, only the incinerator train will be undergoing closure activities. Upon the completion of closure activities, the building will continue to be used for the bulk storage of hazardous waste.

The incinerator closure process concerns only the incinerator train and the associated waste feed lines. This process includes the disposal of materials deemed hazardous wastes, disposal of hazardous waste residues and the decontamination of areas potentially contacted by incinerator operations. The following detailed procedures will describe this work:

1. Remove any ash from the incinerator, residue from the waste heat boiler (if present) and Tellerette packing from the air pollution control equipment. All ash/residue will be wetted for dust control and removed by shovel, hand trowel or vaccum. The resulting accumulation of ash/residue along with any contaminated disposable clothing will be drummed and treated as hazardous waste. Any tools used during ash/residue removal will be decontaminated using an industrial grade non-phosphate detergent and water solution with a plant tap water rinse. All rinsate will be collected and treated as a hazardous waste liquid at the CWTP.

2. The waste feed lines will be decontaminated using a flushing procedure originating from the pump room located in the basement of the barrel storage building.

   The cyanide feed line will be flushed using a three step rinsing process. The first rinse will consist of plant tap water. This will be followed by a dilute sodium hydroxide solution rinse. The third rinse will be with plant tap water. The rinsate following the third rinse will be collected and tested following the procedures and parameters detailed in Sections 10.0 and 11.0. If the rinsate is found to be hazardous then the three step rinsing procedure will be repeated until the plant tap water rinse is determined to be non-hazardous following the criteria in Section 11.0. The cyanide feed line will then be sealed at both ends and abandoned in place.

   All rinsate from the cyanide line flushing will be collected and treated as a hazardous waste.

As stated in Section 3.0 the only other underground waste feed lines installed were for blended oils. These two lines were never charged with product since blended oil was never burned during test burns. Therefore, the decontamination of these lines will consist of a single rinse of plant tap water. After at least a full volume of water has passed, the rinsate will be collected and tested following the procedures and parameters detailed in Sections 10.0 and 11.0. Although not anticipated, if the rinsate is found to be hazardous then a two step rinsing procedure will be implemented. The first rinse will consists of a non-hazardous biodegradable degreaser and water solution. This will be followed by a plant tap water rinse. The rinsate from the second rinse will be collected and tested as above to determine if it is hazardous. If the rinsate is hazardous then the two-step rinsing process will be repeated until the plant tap water rinse is determined to be non-hazardous. The blended oil feed lines will then be sealed at both ends and abandoned in place.

All rinsate from the blended oil line flushing will be collected and treated as hazardous waste.

3. Disassemble the incinerator train and stockpile pieces in a plastic lined dump trailer or roll-off container. Disassembly will consist of manual dismantling and/or the use of powered equipment. The option is available to use both hot or cold cutting techniques. The size of stockpiled components will be directly influenced by the disposal facilities requirements for landfilling. It is anticipated that all piping will be cut into four foot sections and that larger components will not exceed 10 feet in any dimension. The refractory lining and miscellaneous debris will be stockpiled along with the incinerator train hardware.

   Any potential for fugitive dust emissions will be minimized by wetting the incinerator train components during the dismantling. All accumulated wetting agent will be collected by wet vaccum and treated as a hazardous waste.

   Prior to dismantling the air pollution control equipment a plastic sheeting barrier will be installed separating this equipment from the active wax/solvent tank. This barrier will serve to segregate the active wax/solvent tank operations from all dismantling and decontamination operations associated with incinerator closure activities.

4. Shotblast or scarify the concrete pad which functions as the footing for the incinerator combustion chambers. The potential for fugitive dust emissions will be minimized by utilizing equipment which immediately contains all generated residue. This residue will be collected, stored

and treated as a hazardous waste.

5. Hydroblast the ceiling in the building and the concrete pit which formerly housed the air pollution control equipment. Hydroblasting of the ceiling will proceed to the plastic sheeting barrier which separates the active wax/solvent tank from the incinerator closure activities. Areas that will not be hydroblasted will be covered with plastic sheeting to prevent water damage and cross contamination to clean areas.

   The cleaning solution will consist of biodegradable industrial surfactant (i.e. M-Oil Free, Penetone) and water mixture. Spent rinsate will be contained through the use of dikes to prevent wash water migrating into clean areas. This rinsate will be collected using a wet/dry vaccum then stored and treated as a hazardous waste.

6. Decontaminate equipment used during incinerator closure activities. Decontamination of specific equipment will be deemed necessary based on whether the equipment was in direct contact with the incinerator train components, collected ash/residues, or waste feed line and hydroblasting rinsates. As state above, smaller manual tools will be decontaminated using an industrial grade non phosphate detergent and water solution. Larger tools (i.e. lifts, hoists) will be decontaminated by steam cleaning. All rinsate generated during decontamination activities will be collected and treated as hazardous waste.

7. Retain a fully permitted hazardous waste transporter and ship all incinerator train components to a secure landfill disposal facility.

8. Conduct discrete concrete chip sampling of the concrete pad that was formerly used as the footing of the incinerator combustion chambers and the concrete pit formerly holding the air pollution control equipment. Sample methodology and analytical testing will follow the procedures outlined in Sections 10.0 and 11.0.

9. Complete the Certification of Closure as presented in Section 12.0. Within 60 days of completion of all closure activities, the Certification of Closure will be sent by registered mail to the EPA Regional Administrator and the Commissioner of the Connecticut Department of Environmental Protection.

Table 1 presents the estimated timetable to complete all required closure activities described in this section. All dates are contingent upon the completion of the required public notice period and approval of the closure plan occuring at Day 0.

TABLE 1

TRACKABLE CLOSURE TIMETABLE

	Estimated Time To Complete Steps	Total Time
Steps 1 to 8	60 Days	60 Days
Certification	30 Days	90 Days
Step 9	90 Days	180 Days

It is expected that all closure activities will be completed in the year 1990. Closure activities may be completed ahead of the timetable outlined in Table 1; however, all closure activities described herein will be completed within 180 days after receiving final approval from EPA/DEP pursuant to 40 CFR Subpart 265.113(b).

8.0 MAXIMUM WASTE INVENTORY

As described in Section 5.0 the incinerator has never operated apart from the four allowed test burns. The wastes relating to incinerator operation include incinerator ash, scrubber waters and scrubber sludges. The amount of each waste generated during the test burns is described below.

1. Incinerator ash - The wastes burned were not high in ash content or burned in sufficient volumes to produce any significant quantities of ash. Any bottom ash produced in the incinerator accumulates in the primary combustion chamber. Visual inspection of this unit resulted in an observation of less than one cubic yard of ash. All ash will be removed from the chamber following the procedures outlined in Section 7.0. No visible quantities of ash have been observed on any other components of the incinerator train. Any ash identified during closure activities will be collected, stored and treated as hazardous waste.

2. Scrubber waters - During the test burns the scrubber waters were kept in the pH range of 7.0 to 8.5. After each test burn all scrubber waters were tested internally for cyanide, chromium and pH. These waters were treated if necessary and then discharged into the NPDES permitted waste water treatment system. Since the incinerator has not been operational since 5/30/84 there is no inventory of scrubber waters to consider during closure activities.

3. Scrubber sludges - The test burn durations were not long enough to produce any scrubber sludges. Therefore, there is no inventory of scrubber sludge to consider during closure activities.

9.0 CLOSURE COST ESTIMATE

Closure cost estimates for incinerator closure activities are based on proposed contractor rates available in the local area as of 1989. Approximately six individuals will comprise the working party. The working party includes the site manager, site safety officer, equipment operators and technicians.

Analytical costs for collected aqueous and concrete chip samples are based on local laboratory costs as of 1989. These costs include all QA/QC samples necessary.

Task 1	Mobilization and Site Preparation	$ 6,000
Task 2	Removal and Disposal of Ash Residue and Scrubber Packing Media	
	A. Labor (1 day)	$ 2,000
	B. Disposal (4cy. @$135cy.)	600
	Subtotal	$ 2,600
Task 3	Waste Feed Line Decontamination	
	A. Labor (1 day)	$ 2,000
	B. Equipment	200
	C. Disposal (200gal. @$.50/gal.)	100
	Subtotal	$ 2,300
Task 4	Incinerator Train Dismantling	
	A. Labor (11 days)	$45,000
	B. Equipment	15,000
	Subtotal	$60,000
Task 5	Building Decontamination	
	A. Shotblast/Scarify Concrete Pad	
	1. Labor (.5 day)	$ 1,000
	2. Equipment	500
	3. Disposal (1cy. @$135/cy.)	135
	B. Hydroblast Ceiling and Concrete Pit	
	1. Labor (1.5 days)	3,000
	2. Equipment	300
	3. Disposal (200gal. @$.50gal.)	100
	Subtotal	$ 5,035

Task 6	Sampling and Analytical Program	
	A. Labor (1 day)	$ 1,000
	B. Rinsate (6 samples)	2,500
	C. Concrete Chip (10 samples)	4,500
	D. Data Validation (1.5 days)	1,000
	Subtotal	$ 9,000
Task 7	Disposal of Incinerator Train	
	A. Transportation (3 loads @$4,400/load)	$13,320
	B. Secure Landfill Disposal (2500c.f. @$9/c.f.)	22,500
	Subtotal	$35,820
Task 8	Demobilization	$ 5,000
Task 9	Closure Certification Connecticut P.E.	$ 2,000
	Subtotal	$127,755
	Contingency at 20%	25,551
	Total	$153,306

10.0 SAMPLING PROCEDURES

Sampling procedures during incinerator closure activities will pertain to three sample types: drummed ash/residue, waste feed line rinsate and concrete chip samples.

* Drummed ash/residue - As outlined in Section 6.0 all ash/residue encountered during incinerator closure activities will be collected, stored and treated as hazardous waste. No sampling of drummed ash/residue is proposed; however, if sampling is performed to determine a non-hazardous condition each drum of ash/residue will be sampled separately. Samples will be collected from the drums using a Coliwasa or glass "thief" sample tube. These sampling devices allow a composite sample to be taken covering the entire depth of the drum. All glass sample tubes will be new, and will be discarded immediately after use. The Coliwasa, if used, will be cleaned after each use with an industrial non-phosphate detergent solution, distilled water rinse, hexane rinse, and distilled water rinse in that order.

* Waste feed line rinsate - Rinsate collected during the waste feed line flushing operations will be collected, stored and treated as hazardous waste unless analytical

tests determine a non-hazardous condition. To determine whether flushing operations are complete an effluent sample will be collected directly from the discharge end of the waste feed line. This sample will be collected following the full volume of the waste feed pipeline has been flushed with the final plant tap water rinse. The sample will be collected directly into laboratory supplied glassware.

One influent plant tap water sample will be collected to demonstrate background water quality. This sample will be collected directly from the spigot used for flushing operations after the water is allowed to flow for at least five minutes. The sample will then be collected directly into the laboratory supplied glassware.

The field QA/QC program used during aqueous sampling operations will include trip blanks, field blanks and blind duplicate samples. The trip blank will consist of pre-bottled deionized water that will accompany the laboratory glassware to and from the laboratory. One field blank will be performed at the time of sampling. Laboratory supplied deionized water will be poured directly into 40ml glass vials with teflon lined caps. One blind duplicate sample will be collected from one of the three waste feed lines. Immediately following the primary water sample, a second sample will be collected in the same manner.

* Concrete Chip Samples - Following the shotblasting/ scarifying of the concrete pad that formerly functioned as the footing of the incinerator and hydroblasting the concrete pit which formerly held the air pollution control equipment, concrete chip samples will be collected. A total of two discrete samples will be collected from the concrete pad and one discrete sample will be collected from each wall and floor of the concrete pit. In addition one discrete sample will be collected from the concrete pit to function as background concrete quality. An air chisel or concrete drill will be used to dislodge the concrete chips. The portion of the tool in direct contact with the concrete will be cleaned between samples using an industrial non-phosphate detergent wash and a tap water rinse. The resulting concrete chips will be transferred directly into laboratory supplied glassware. The field QA/QC program for concrete chip samples will consist of one trip blank to accompany the samples to the laboratory.

Immediately following sample collection each sample will be labeled and placed in an iced cooler. The samples will be transported under full chain-of-custody to a State of Connecticut approved laboratory.

11.0 TESTING AND DETERMINATION PROCEDURES

A specific analytical parameter list has been developed for all ash/residue, waste feed line rinsate and concrete chip samples collected during incinerator train closure activities. As presented in Table 2 this list is representative of all listed hazardous waste constituents potentially present in the cyanide solution and wax/solvent mixture, the only waste streams burned in the incinerator. In addition, the characteristic hazardous waste parameters of corrosivity and extraction procedure toxicity have been deemed applicable and are therefore included.

TABLE 2

LISTED HAZARDOUS WASTE CONSTITUENT PARAMETERS AND ANALYTICAL METHODS

Parameter	Aqueous (Rinsate)	Solid-Mass Analysis (Concrete chip/ ash/residue)
Metals		
Arsenic	3010/7060	3050/7060
Barium	3010/6010	3050/6010
Cadmium	3010/6010	3050/6010
Chromium (Total)	3010/6010	3050/6010
Chromium VI	-- /7196	-- /7196
Copper	3010/6010	3050/6010
Lead	3010/6010	3050/6010
Mercury	3010/7470	3050/7471
Nickel	3010/6010	3050/6010
Selenium	3010/7740	3050/7740
Silver	3010/6010	3050/6010
Cyanide	-- /9010	-- /9010
Volatile Organic Compounds		
Carbon Tetrachloride	5030/8010	5030/8010
1,1-Dichloroethylene	5030/8010	5030/8010

Methylene Chloride	5030/8010	5030/8010
Tetrachloroethylene	5030/8010	5030/8010
1,1,1-Trichloroethane	5030/8010	5030/8010
Trichloroethylene	5030/8010	5030/8010

* 5030/8010 - preparation method / analytical method

The analytical methods presented above have been selected from the third edition of EPA Publication SW-846 - Test Methods for Evaluating Solid Waste. The designated laboratory will follow all applicable internal QA/QC procedures outlined in SW-846.

Upon receipt of the analytical data, an initial evaluation of the results will be performed through data validation. Data validation includes a review of field QA/QC procedures (i.e. trip blanks, field blanks) and laboratory QA/QC procedures (i.e. holding times, blind duplicate analysis, surrogate recoveries). Data points that are not adequately supported by the QA/QC procedures will be referred to the sampling team and/or the laboratory for appropriate corrective actions.

Upon completion of data validation, the results will be compared to background data points and the relevant and appropriate regulatory standards and criteria. An explanation of how this will be performed for each sample media (aqueous or solid) is presented below.

Waste Feed Line Rinsate- As stated in Section 10.0 decontamination of the waste feed lines will be verified through effluent sampling of the third plant tap water rinse. Results from the influent sample will be used as background water quality data and effluent sample results will be compared to this background data point. In addition, effluent results will be compared to available drinking water standards as presented in Appendix E, Table 1. Table 1 has been prepared based on available federal primary, secondary and recommended contamination levels and the State of Connecticut Department of Health Services drinking water action levels.

Decontamination of the waste feed lines will be deemed complete if all effluent sample concentrations fall below the levels indicated in Appendix E, Table 1. If any parameter exceeds the levels in Appendix E, Table 1 but is at or below the influent sample concentration for the same parameter then decontamination is deemed complete. If any parameter exceeds the respective level in Table 1 and the influent sample concentration for that constituent the decontamination efforts must continue as specified in Section 7.0.

Concrete Chip Samples - As stated in Section 10.0, decontamination of the concrete pad and the concrete pit will be demonstrated complete by concrete chip sampling of the material identified to remain following closure activities. Analytical data will be

generated for the concrete on a mass analysis basis for all the parameters in Table 2. The hazardous waste characteristic for EP toxicity will be determined by performing the EP toxicity test for selected metals.

Results for the background sample collected in the concrete pit will be used for comparison with other sample results from the concrete pit. However, due to the limited size and orientation of the concrete pad, no background sample was proposed and therefore no comparison can be made.

EP toxicity test results will be compared to the regulatory levels pursuant to 40 CFR Subpart 261.3. If any parameter exceeds the applicable regulatory level then decontamination will be deemed incomplete in the area of that sample. If this circumstance occurs on any sample from the concrete pad then the contingency will be activated whereby the entire pad will be removed and treated as a hazardous waste. If this circumstance occurs for any sample collected in the concrete pit, decontamination efforts will continue until followup sample data achieves the regulatory levels pursuant to 40 CFR Subpart 261.3.

In addition to the EP toxicity evaluation, data evaluation against health based risk levels for detected contaminants will be performed. This evaluation will only be performed for parameters that have health based risk levels associated with them. The available health based risk levels have been obtained from EPA Publication SW-87-001 RCRA Facility Investigation Guidance and are presented in Appendix E, Table 2. Evaluation will consist of comparing identified constituents levels to available background levels and to health-based risk levels. Decontamination efforts will be deemed incomplete if constituent levels exceed health based risk levels except materials that demonstrate such levels but are consistent with ambient background levels. Decontamination efforts must continue until followup sampling demonstrates that parameters are at or below health based risk standards or are consistent with background levels. Any concrete chip sampling areas which exhibit levels consistent with background and either above or below health based risk levels will be considered representative of ambient background levels thus decontamination efforts will be deemed complete.

12.0 CERTIFICATION OF CLOSURE

The certification statement presented below will be sent via registered mail to the EPA Regional Administer and the Commissioner of the Connecticut DEP within 60 days of the completion of closure pursuant to 40 CFR Subpart 265.120.

CERTIFICATION OF CLOSURE

"I,_____, for Pratt & Whitney Group, United
(Name)

Technologies Corporation, owner and operator of the hazardous waste incinerator at 400 Main Street, East Hartford, and I, _____, P.E., employed
(Name)

by_____, certify by means of our
(Firm)

signatures, that the incinerator named above has been closed in accordance with the method specified by the closure plan dated _____, and attached hereto. Closure was completed on _____.
(Date)

_____	_____
Pratt & Whitney Group	P.E.
_____	_____
Title	Firm
_____	_____
Date	Date

APPENDIX A

SITE HEALTH AND SAFETY PLAN

A job specific health and safety plan has been developed for activities to be performed during the closure of the Burn-Zol liquid hazardous waste incinerator located at United Technologies - Pratt & Whitney in East Hartford, Connecticut. The plan addresses the anticipated operating conditions during closure activities and the personal protection strategies available for all field team members.

The health and safety plan is designed to function as a general outline for the contractor conducting closure activities. Specific information relating to the dates of closure activities and individual field team members have been left blank. This plan may be superceded by a contractor specific health and safety plan; however, the plan must meet or exceed the general requirements set forth as follows.

SITE HEALTH & SAFETY PLAN

A. GENERAL INFORMATION

SITE: United Technologies - Pratt & Whitney

LOCATION: 400 Main Street, East Hartford, CT 06108

PREPARED BY: Scott L. Singer

JOB SCOPE OF WORK: Incinerator Closure (dismantling)

PROPOSED DATE OF JOB: _____

B. SITE/HAZARD OVERVIEW

APPARENT HAZARD:	TYPE OF FACILITY:	STATUS OF FACILITY
Serious _____	Lagoon _____	Active _____
Moderate _____	Dump/LF _____ tank	Inactive X
Low X	Open Bldg _____	Unknown _____
None _____	Other Incinerator	

WASTE TYPE(S)	WASTE CHARACTERISTICS	TYPE/FORM OF HAZARDS
Gas _____	Toxic X	Dust X
Liquid X	Corrosive _____	Liquid _____
Sludge _____	Ignitable _____	Fumes _____
Solid X	Volatile _____	Vapors X
Unknown _____	Radioactive _____	Contact _____
Other _____	Reactive X	Other _____
	Unknown _____	IDLH _____

The following substance(s) are known or suspected to be on site. The primary hazards of each are identified.

SUBSTANCES INVOLVED	CONCENTRATIONS	PRIMARY HAZARD
Incinerator Ash (CN, Metals)	Unknown	Inhalation
Waste feed line Rinsate (CN, Metals)	Unknown	Ingestion, direct contact
Refractory brick (Cr)	See Appendix D	Inhalation
Wax/solvent Tank (VOCs)	See Appendix C	Inhalation

The following additional hazards are expected on site: _____

Hazardous substance information form(s) for the involved substance(s) have been completed and are attached.

C. SITE DESCRIPTION AND HISTORY

BRIEF DESCRIPTION Incinerator located at the Concentrated Waste Treatment Plant. Reference Appendix B, Figure 3 for current layout.

SKETCH/MAP ATTACHMENT A.

HISTORY A total of four test burns conducted from 1982-1984. Incinerator has been inactive since the last test burn dated 5/30/84.

D. ON-SITE CONTROL

Contractor has been designated to coordinate access control and security on site. A safe perimeter has been established at the incinerator building entrance.

No unauthorized person should be within this area. Control boundaries have been established, and the exclusion zone (the contaminated area, hotline, contaminated reduction zone, and support zone [clean area]) have been identified and designated as follows:

exclusion zone-incinerator building, hotline-building entrance

reduction and support zone-outside of incinerator building

These boundaries are identified by: the walls of the incinerator building. If necessary, expansion of the exclusion zone will be coordinated by the contractor.

E. ON-SITE PERSONNEL

SITE MANAGER: Contractor

SITE SAFETY OFFICER: Contractor

PRATT & WHITNEY REPRESENTATIVE: Scott Singer

REGULATORY AUTHORITY: EPA/CT DEP

FEDERAL AGENCY REPS: Mr. Stephen Yee EPA Region I

STATE AGENCY REPS: Mr. George Dews CT DEP

LOCAL: N/A

WORK PARTY(S) CONSISTING OF AT LEAST 2 PERSONS WILL PERFORM TASKS.

PARTY TEAM LEADER: _____

WORK PARTY #1 _____

_____

WORK PARTY #2 _____

_____

RESCUE TEAM (required if entries made to IDLH environment)

_____

_____

DECON TEAM: _____

_____

The work party(s) were briefed on the contents of this plan at:

(Time) _____ on (Date) _____

MONITORING/SURVEILLANCE EQUIPMENT

HNU _____ METAL DETECTOR _____

OVA/GC _____ EXPLOSIMETER _____

DRAEGER TUBES _____ O_2 DETECTOR _____

RADIATION SURVEY METER _____

NOTES: _____

_____

_____

F. GENERAL SAFETY REQUIREMENTS

The following General Safety Procedures shall be followed by all persons entering and/or working on the site:

All members of the working partying will be familiar with the contents of this Health & Safety Plan. At the beginning of each working day a safety meeting will be held to summarize the previous day(s) progress and to outline the days activities with respect to safety and health.

- No contractor or subcontractor may be allowed on site during work activities without the prior knowledge and consent of the site Manager and/or Safety Officer.

- There will be no activities conducted on site without sufficient backup personnel. At a minimum, two persons must be present at the site.

- All contractor or subcontractor personnel shall bring to the attention of the site Health and Safety Officer or Supervisors any unsafe condition or practice associated with the closure activities that they are unable to correct themselves.

- There will be no smoking, eating, chewing gum, or drinking in the restricted area.

- Hands shall be thoroughly cleaned prior to smoking, eating or other activities outside the restricted area.

- Team members must avoid unnecessary contamination (i.e., walking through known or suspected "hot" zones or contaminated puddles, kneeling or sitting on the ground, leaning against potentially contaminated barrels or equipment).

- Respiratory devices may not be worn with beards, long sideburns, or under other conditions that prevent a proper seal.

- Respiratory devices must not be worn with contact lenses.

- No visitors will be allowed access without the knowledge and consent of the Site Manager and/or Safety Officer. All visitors will be required to be briefed on safety procedures and will be required to be escorted while on site.

G. COMMUNICATION PROCEDURES

Attached when applicable used with IDLH atmospheres.

H. PERSONAL PROTECTIVE EQUIPMENT

Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work areas or tasks.

LOCATION	JOB FUNCTION	LEVEL OF PROTECTION
Exclusion Zone	Incinerator dismantling	A B C (D) Other
	Refractory ash handling	A B (C) D Other
Contamination		A B C D Other
Reduction Zone	Decontamination	A B C (D) Other

Additional Protective Equipment for each level of protection is as follows:

Level A _____

_____

_____

_____

_____

Level B _____

_____

_____

_____

_____

Level C air purifying respirator, coveralls, gloves, boots, hard hat

Level D coveralls, gloves, boots, hard hat

Other _____

I. DECONTAMINATION PROCEDURES

Personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated.

The following decontamination equipment is required:

wash tubs, brushes, non-phosphate detergent, trash barrels,

steam cleaner

Non-phosphate detergent & water will be used as the decontamination solution.

J. EMERGENCY INFORMATION

LOCAL RESOURCES	PHONE #	CONTACT
Ambulance	911	--
Hospital Emergency Room	524-2525	Hartford Hospital
Fire Department	528-4173	--
Police Department	528-4401	--
Local Regulatory Authority	566-2264	Mr. George Dews (DEP)
Reg. Regulatory Authority	(617)573-9644	Mr. Stephen Yee (EPA)

K. EMERGENCY MEDICAL CARE

The following are qualified on-site First Aiders, EMT's:

EMERGENCY ROUTES - Hospital Willow St., - Rte. 2 North - Rte. 5 South - left on Prospect St. - Right on Charter Oak Ave. - left on Main St. - right on Jefferson Street - left on Seymour Street

First Aid equipment is available on-site at the following locations:

FIRST AID KIT Contractor

EMERGENCY EYE WASH Contractor

EMERGENCY SHOWER _____

OTHER (Specify) _____

SITE RESOURCE(S) LOCATIONS

WATER SUPPLY Concentrated Waste Treatment Plant

TELEPHONE(S) Concentrated Waste Treatment Plant

COMMUNICATION SYSTEMS --

OTHER _____

L. ENVIRONMENTAL MONITORING

The following environmental monitoring instruments shall be used on-site at the specified intervals.

Combustible Gas Indicator - Continuous Daily Hourly Other _____

O_2 Monitor - Continuous Daily Hourly Other _____

Collorimetric Tubes - Continuous Daily Hourly Other _____

HNU-OVA - Continuous Daily Hourly Other _____

Other _____

M. EMERGENCY PROCEDURES

(These procedures should be modified as required for incident)

The following standard emergency procedures will be used by on-site personnel. The Site Manager/Safety Officer shall be notified of any on-site emergencies and be responsible for ensuring that the appropriate procedures are followed.

Personnel Injury in the EXCLUSION ZONE: Upon notification of an injury in the Exclusion Zone, the designated emergency signal shall be sounded. All site personnel shall assemble at the decontamination line. The rescue team will enter the Exclusion Zone (if required) to remove the injured person to the hotline. The Site Safety Officer and Project Team Leader should evaluate the nature of the injury, and the affected person should be decontaminated to the extent possible prior to movement to the Support Zone. The on-site EMT/or First Aider shall initiate the appropriate first aid, and contact should be made for an ambulance with the designated medical facility (if required). No persons shall reenter the Exclusion Zone until the cause of the injury or symptoms is determined.

Personnel Injury in the SUPPORT ZONE: Upon notification of an injury in the Support Zone, the Project Team Leader and Site Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with the on-site EMT/or First Aider initiating the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others, the designated emergency signal shall be sounded and all site personnel shall move to the decontamination line for further instructions. Activities on-site will stop until the added risk is removed or minimized.

Fire/Explosion: Upon notification of a fire or explosion on-site, the designated emergency signal shall be sounded and all site personnel assembled at the decontamination line. The fire department shall be alerted and all personnel moved to a safe distance from the involved area.

Personal Protective Equipment Failure: If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his/her buddy shall immediately leave the Exclusion Zone. Re-entry shall not be permitted until the equipment has been repaired or replaced.

Other Equipment Failure: If any other equipment on-site fails to operate properly, the Project Team Leader and Site Safety Officer shall be notified and then determine the affect of this failure on continuing operations on-site. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

The following emergency escape routes are designated for use in those situations where egress from the exclusion zone cannot occur through the decontamination line: any available exit from the incinerator building

In all situations, when an on-site emergency results in evacuation of the Exclusion Zone, personnel shall not re-enter until:

1) The conditions resulting in the emergency have been corrected.

2) The hazards have been reassessed.

3) The site safety plan has been reviewed.

4) Site personnel have been briefed on any changes in the Site Safety Plan.

s-s2u 1989

APPENDIX B

FIGURES AND PLATES

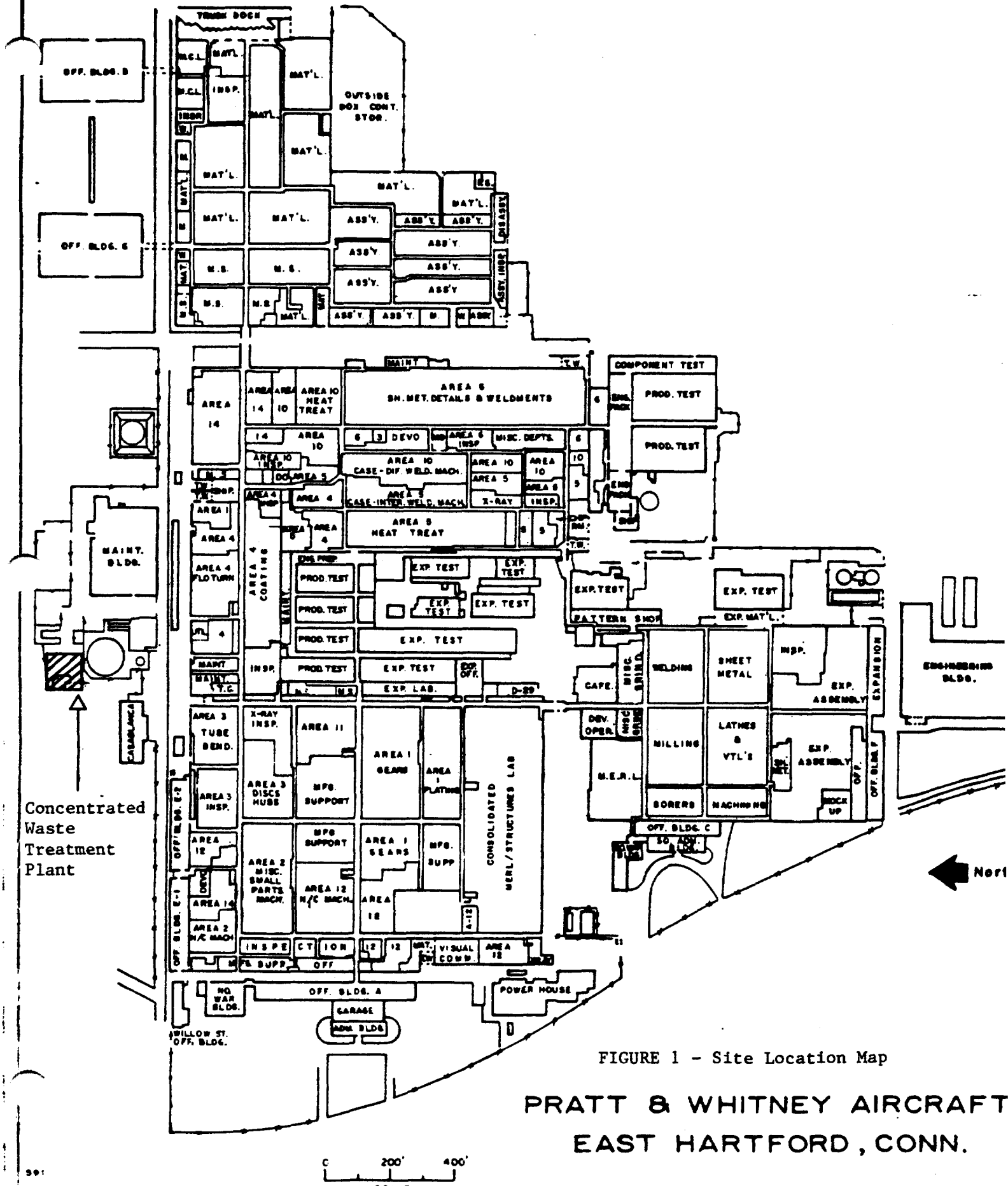
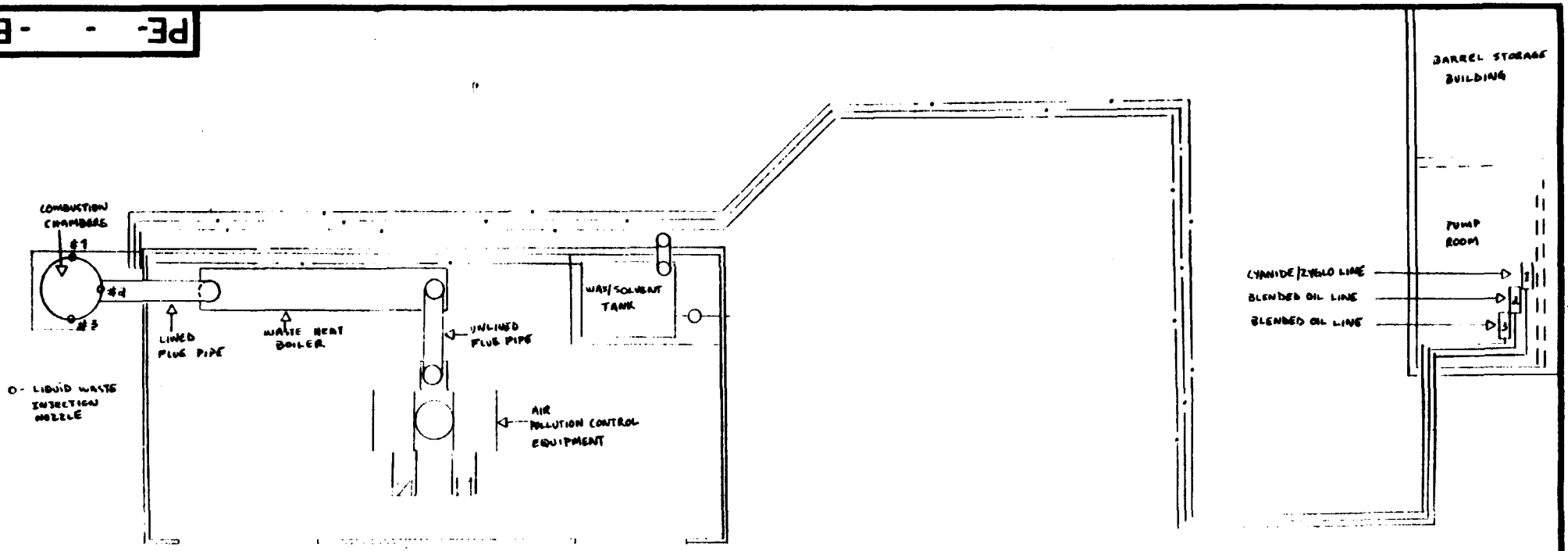


FIGURE 1 - Site Location Map

PRATT & WHITNEY AIRCRAFT
EAST HARTFORD, CONN.

991
Plant Layout 9-17-87

PE- - -B



N

REV.	DESCRIPTION OF REVISION	DATE	BR. BY	APPR.

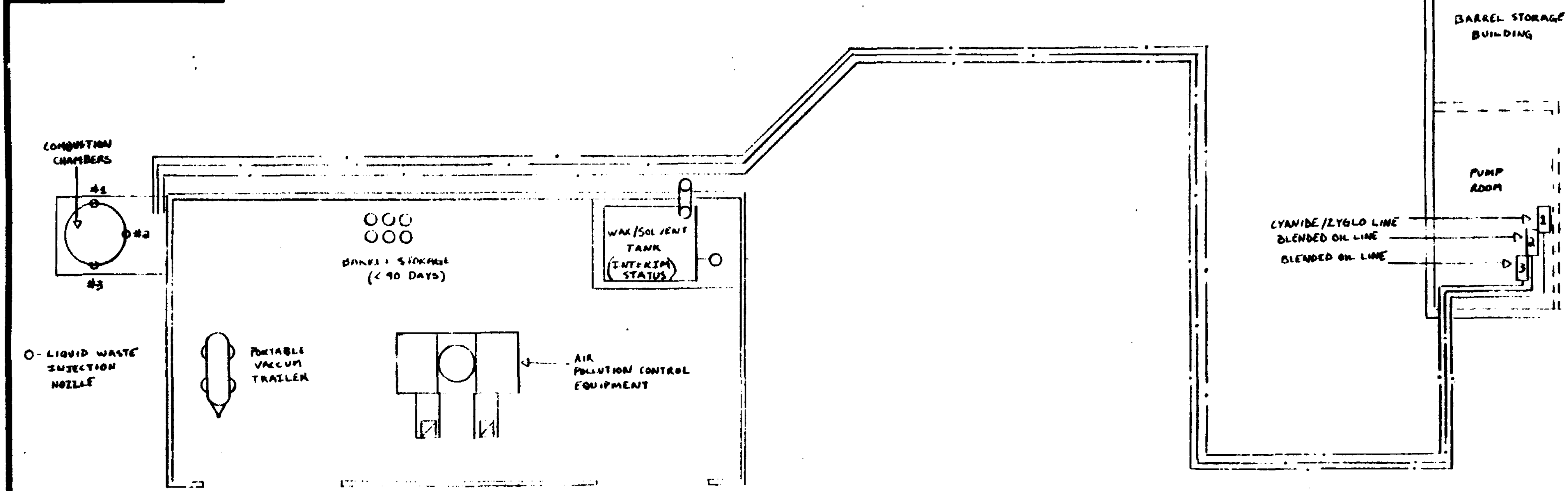
FIGURE 2

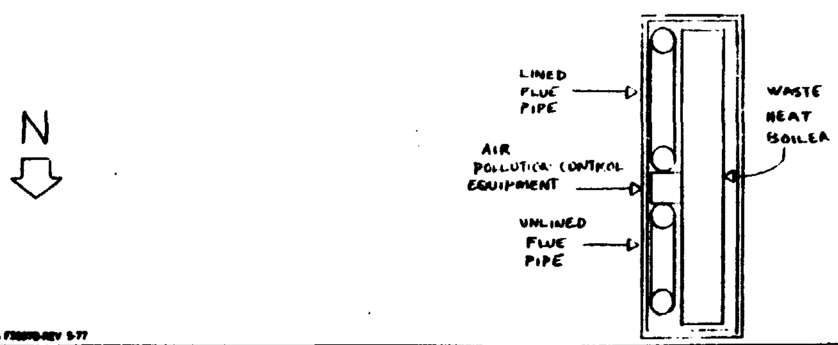
INCINERATOR SKETCH LAYOUT — PRE 1988

PRATT & WHITNEY AIRCRAFT GROUP
Manufacturing Division
PLANT ENGINEERING DEPARTMENT
EAST HARTFORD, CONNECTICUT 06108 U.S.A.

LOCATION	CWTP
SCALE	NOT TO SCALE
DRAWN BY	SLS
DATE	6/22/89
CKD BY	
DATE	
APP BY	
DATE	
JOB ORDER NO	
DRAWING NO.	PE- - -B

NWG 40-21 27861-3





REV.	DESCRIPTION OF REVISION	DATE	DR. BY	APPR

FIGURE 3

INCINERATOR SKETCH LAYOUT AS OF JUNE 22, 1989

LOCATION: CWTP

SCALE: NOT TO SCALE

DRAWN BY: SLS — DATE: 6/22/89

CKD BY — DATE

APP BY — DATE

JOB ORDER NO

DRAWING NO. PE- - -B

SHEET NO — NO OF SHEETS

PRATT & WHITNEY AIRCRAFT GROUP UNITED TECHNOLOGIES

Manufacturing Division

PLANT ENGINEERING DEPARTMENT

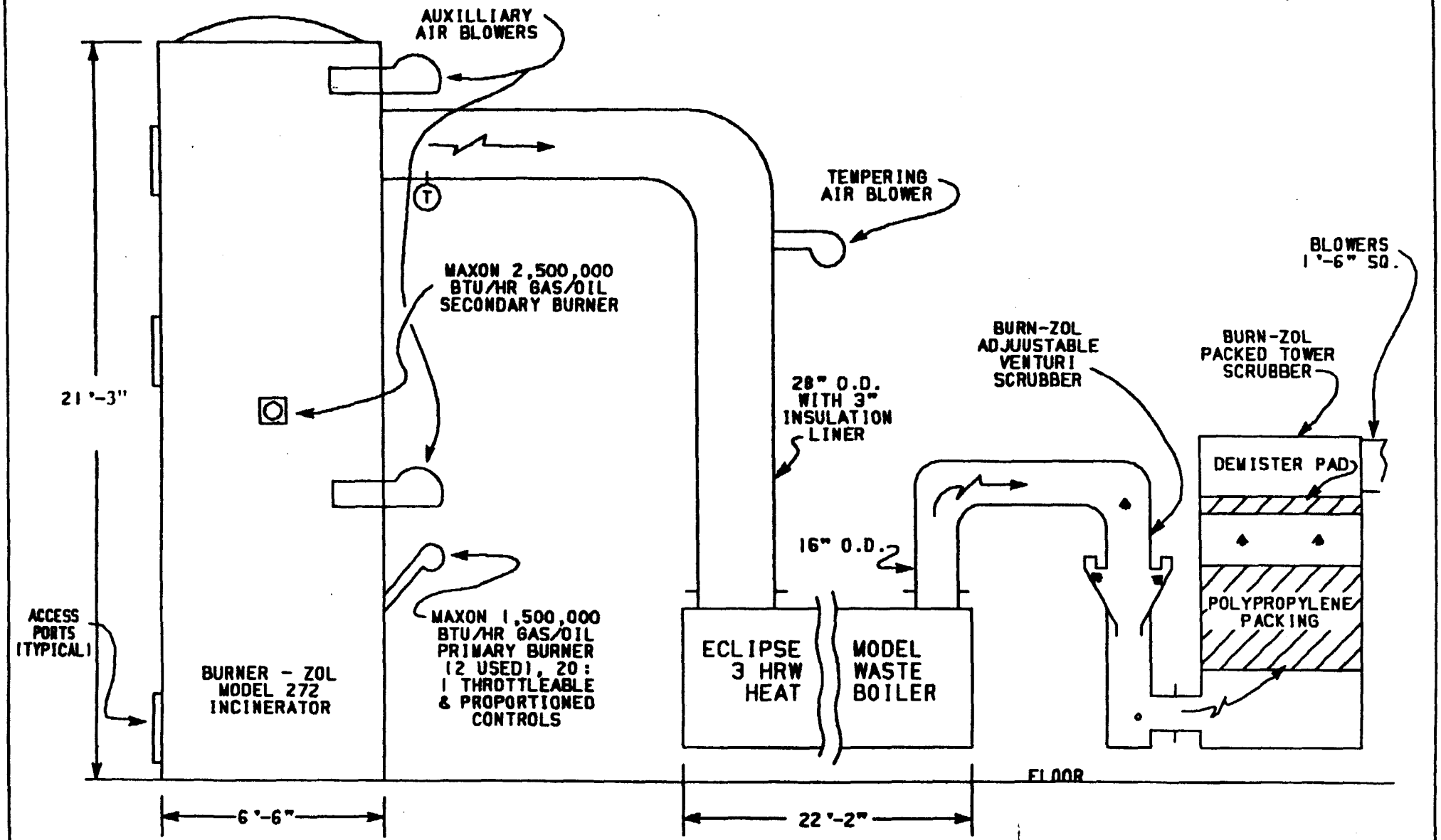
EAST HARTFORD, CONNECTICUT 06108, U.S.A.

HAZARDOUS WASTE INCINERATION SYSTEM

INSTALLED AT

PRATT & WHITNEY, EAST HARTFORD, CONN.

FIGURE 4 Incinerator Train Diagram

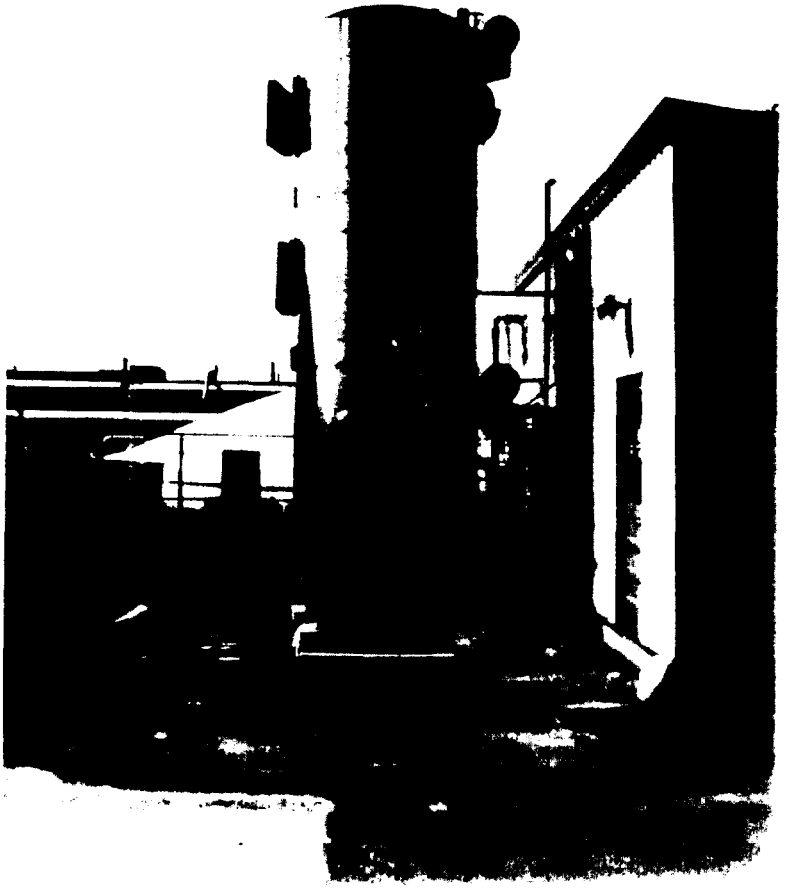


NOTE: A 1,200 ACFM COMBUSTION AIR

Originals in color.

PLATE 1

View looking south 6/23/89. The building currently housing the active wax/solvent storage tank and the air pollution control equipment. Note the combustion chamber on the left side of the building and the exhaust stacks located on top of the building



Originals in color.

PLATE 2

View looking south 6/23/89. Primary and secondary combustion chambers, the tertiary holding chamber and the associated above ground plumbing. Lined flue piping to the waste heat boiler was removed in 1988 and is now stored in a separate enclosure (Plates 3 and 4).

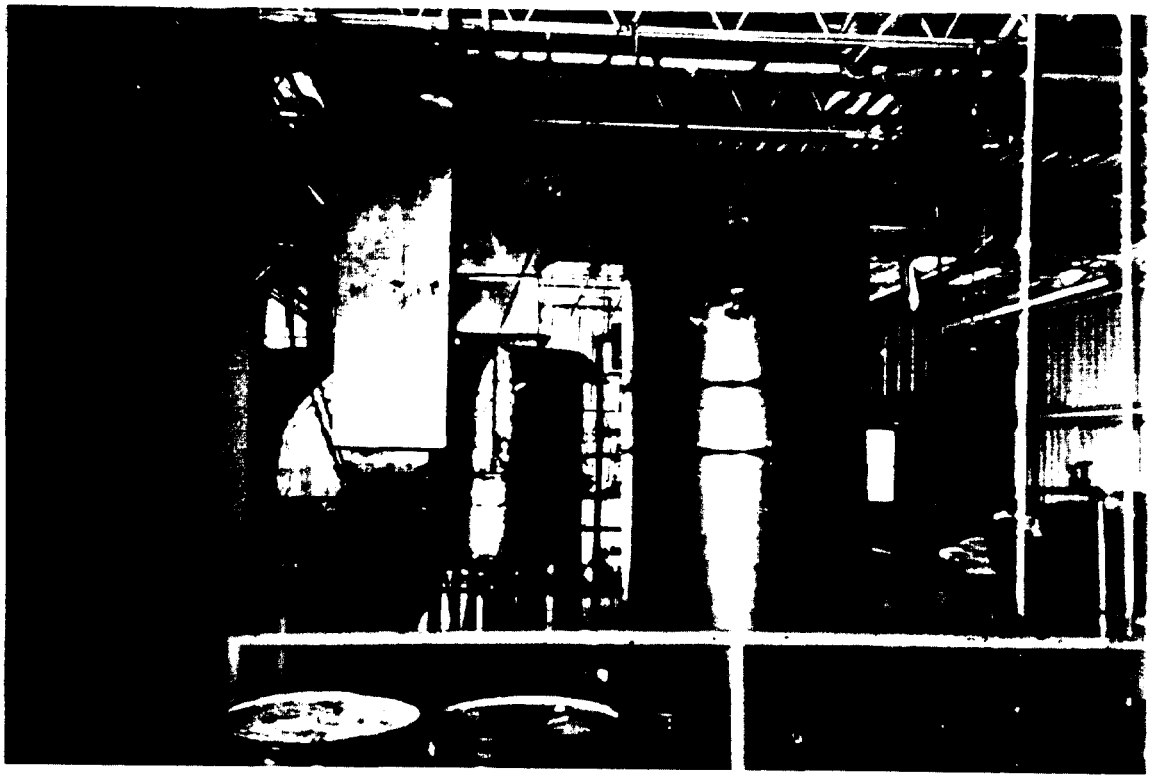
Originals in color.

PLATE 3

View looking north 6/21/89. Incinerator train components in center of the photograph. Note the dedicated enclosure for these components on the right side of the photograph.

PLATE 4

View looking west 6/21/89. Closeup of incinerator train components removed in 1988. Components include the waste heat boiler (22 feet long), the heat exchanger (bottom left), the lined and unlined flue piping and a portion of the air pollution control equipment.



Originals in color.

PLATE 5

View inside the incinerator building 6/23/89. The air pollution control equipment is housed in a concrete pit and protected by railings.

APPENDIX C

WASTE STREAM ANALYTICAL DATA

THE MINGES
ENVIRONMENTAL LABORATORY
A division of The Minges Associates
11 Avon Park North, P.O. Box 657, Avon, CT
203-677
Lawton S. Averill, Laboratory Director
Catherine M. Pintavalle,
Tara L. Vander Els,

December 19, 1983

Pratt & Whitney Aircraft
Maintenance Building
Mail Stop 122-12
East Hartford, CT 06108

Att: William Chudzik

Re: Analysis of "Cyanide" Sample
and "Solvent" Sample

Dear Mr. Chudzik:

Enclosed are results on the cyanide sample #112-55-64, Newlands No. 351 L3 and solvent sample #112-55-62, Newlands No. 387 J3. I hope the results are sufficient at this time.

If further analysis is needed on the wax solvent mixture, another sample is needed.

Very truly yours,

THE MINGES ENVIRONMENTAL LABORATORY

Lawton S. Averill

LSA:lj
Encl.

THE MINGES ENVIRONMENTAL LABORATORY

A division of The Minges Associates, Inc.
11 Avon Park North, P.O. Box 657, Avon, CT 06001
203-677-8309

Lawton S. Averill, Laboratory Director
Catherine M. Pintavalle, Chemis
Tara L. Vander Ele, Chemis

REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney Aircraft
Maintenance Bldg. - Mail Stop 122-12
East Hartford, CT 06108

Date: November 15, 1983

Att: W. Chudzik

SAMPLE DATA: Collected By: Pratt & Whitney Aircraft

SAMPLE NO.	DESCRIPTION OF SAMPLE
112-55-64	Sample labeled "Cyanide" and received October 7, 1983

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 112-55-64				
Cyanide Total	21,300				
Metals					
Aluminum	51				
Cadmium	6020				
Chromium, Total	4.3				
Copper	940				
Nickel	286				
Zinc	11				
Oil and Grease	48				

Lawton S. Averill
The Minges Environmental Laboratory

COPY

THE NEWLANDS SANITARY LABORATORY

Sanitary, Chemical and Bacteriological Investigations

24 TOSEY ROAD
BLOOMFIELD, CONN. 06002
TEL. (203) 242-6291

December 19, 1983

Minges Associates, Inc.
16 Avon Park North
Avon, Conn. 06001

Attn: Mr. Lawton Averill

Gentlemen:

We have the following to report on the sample submitted to this laboratory on October 7, 1983.

Sample No.	38733
Mark	Solid/liquid sample 112-55-62
Infrared	
Solid	parrafin wax
Liquid	Water 85% Perchloroethylene 15%
Total Organic Carbon	
Solid	64.8%
Liquid	2.21%

Visual Examination
This material is approximately 20% liquid and 80% solid.

Very truly yours,

THE NEWLANDS SANITARY LABORATOI

Thomas D. Lee

Thomas D. Lee
Laboratory Director

TDL/cas

FORM: COPY

COPY

THE NEWLANDS SANITARY LABORATORY

Sanitary, Chemical and Bacteriological Investigations

24 TOBEY ROAD
BLOOMFIELD, CONN. 06002
TEL. (203) 242-6291

December 19, 1983

Minges Associates, Inc.
16 Avon Park North
Avon, Conn. 06001

Attn: Mr.Lawton Averill

Gentlemen:

We have the following to report on the sample submitted to this laboratory on December 8,1983.

Sample No.	351L3
Mark	Liquid sample 2% Cyanide 112-55-64

PURGEABLE ORGANICS:

Methylene Chloride	less than 100 ppb
1,1 Dichloroethylene	less than 100 ppb
1,1 Dichloroethane	less than 100 ppb
t-1,2 Dichloroethylene	less than 100 ppb
Chloroform	less than 100 ppb
1,2 Dichloroethane	less than 100 ppb
Bromodichloromethane	less than 100 ppb
1,1,1 Trichloroethane	less than 100 ppb
Carbon Tetrachloride	less than 100 ppb
1,1,2 Trichloroethylene	less than 100 ppb
Chlorodibromomethane	less than 100 ppb
Bromoform	less than 100 ppb
1,1,2,2 Tetrachloroethylene	less than 100 ppb

Very truly yours,

THE NEWLANDS SANITARY LABORATO

Thomas D. Lee
Laboratory Director

TDL/cas

COPY

THE NEWLANDS SANITARY LABORATORY

Sanitary, Chemical and Bacteriological Investigations

24 TOBEY ROAD
BLOOMFIELD, CONN. 06002
TEL. (203) 242-6291

December 19, 1983

Minges Associates, Inc.
16 Avon Park North
Avon, Conn. 06001

Attn: Mr. Lawton Averill

Gentlemen:

We have the following to report on the sample submitted to this laboratory on December 8, 1983.

Sample No.	351L3
Mark	Liquid sample 2% Cyanide 112-55-64
Total Organic Halides (TOX)	less than 10 ppb
Total Organic Carbon (TOC)	38.82 gms/Liter

Very truly yours,

THE NEWLANDS SANITARY LABORATORY

Thomas D. Lee

Thomas D. Lee
Laboratory Director

TDL/cas

APPENDIX D

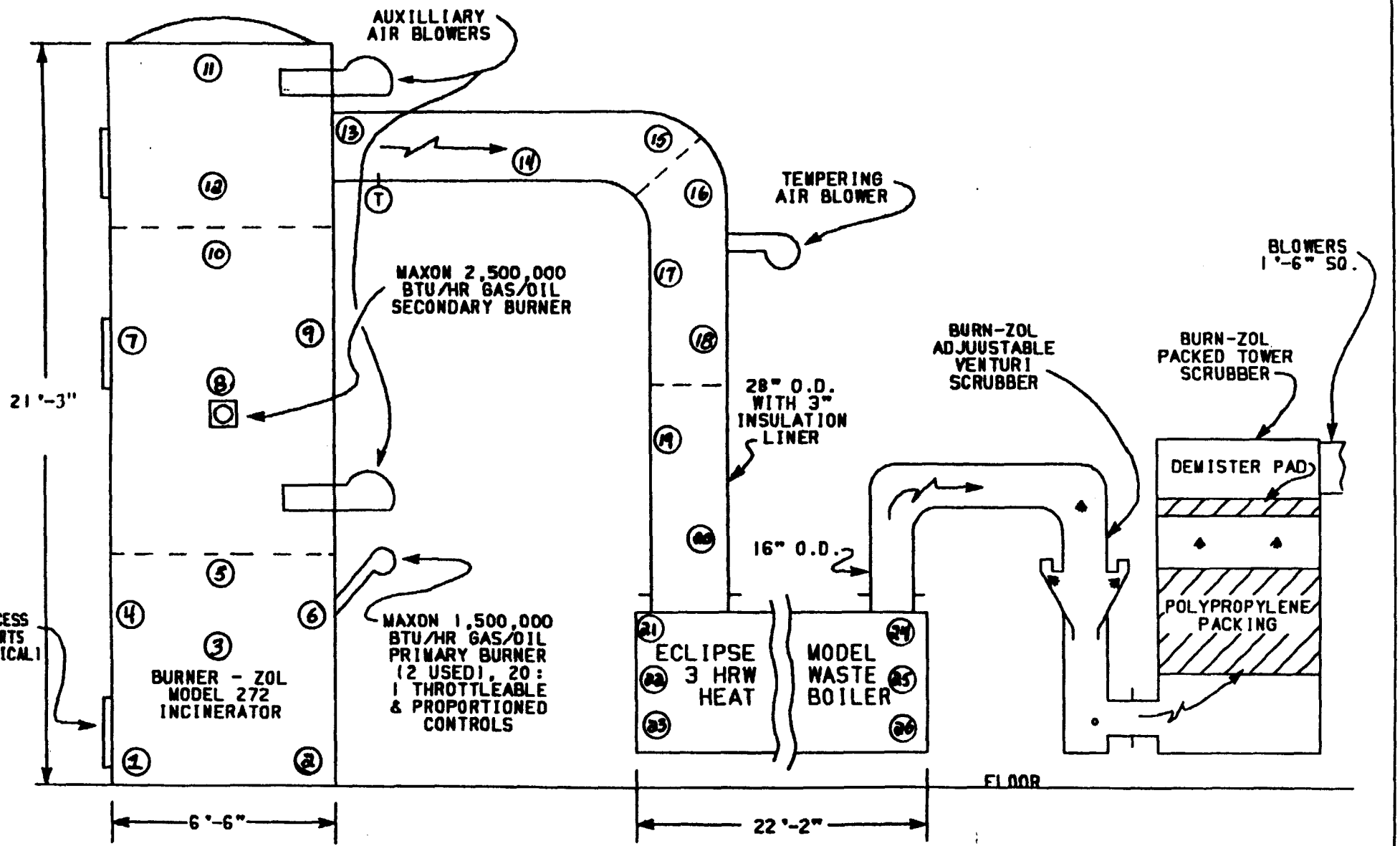
REFRACTORY SAMPLING LOCATIONS AND ANALYTICAL DATA

HAZARDOUS WASTE INCINERATION SYSTEM

INSTALLED AT

PRATT & WHITNEY, EAST HARTFORD, CONN.

REFRACTORY SAMPLING LOCATIONS



NOTE: A 1,200 ACFM COMBUSTION AIR

REFRACTORY SAMPLE DESCRIPTION AND COMPOSITE INFORMATION

See accompanying diagram for further location information. Those samples which are in a continuous block under the location heading below were composited for analysis.

Sample #	Location
1	On hearth in front of access door.
2	On hearth under cyanide injection port.
3	Incinerator primary chamber- north wall.
4	Incinerator primary chamber- west wall above and around the cyanide injection port.
5	Incinerator primary chamber- around and above the solvents injection port.
6	Incinerator primary chamber- above the access port.
7	Secondary chamber above the access port.
8	Secondary chamber on north wall.
9	Secondary chamber on west wall.
10	Secondary chamber on south wall opposite secondary burner and ducted air flow.
11	Tertiary chamber on south wall and south half of dome.
12	Tertiary chamber on north wall and north half of dome.
13	Horizontal crossover pipe one foot from incinerator end.
14	Horizontal crossover pipe- center.
15	Horizontal crossover pipe one foot from the boiler end.
16	Pipe section on airflow impact surface of the elbow- west side.
17	Elbow section on east side two feet up from boiler end.
18	Elbow section- west side.
19	Boiler inlet pipe on east side two feet down from top of pipe section.
20	boiler inlet pipe on west side two feet up from boiler inlet.
21	South side of boiler inlet section.
22	North side of boiler inlet section.
23	Bottom of boiler inlet section.
24	South side of boiler exit section.
25	North side of boiler exit section.
26	Bottom of boiler exit section.

REFRACTORY COMPOSITE SAMPLE RESULTS

Composite of samples	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	Cn
1 and 2	<0.01	<0.2	0.015	46.4	0.06	<0.002	0.009	0.07	0.000
3,4,5,6	0.009	<0.2	0.11	1.1	0.00	<0.002	<0.01	0.01	0.000
7,8,9,10	<0.01	<0.2	0.008	0.23	0.00	<0.002	<0.01	0.003	0.000
11,12	<0.01	<0.2	0.007	0.56	0.00	<0.002	<0.01	0.000	0.000
13,14,15	<0.01	<0.2	0.13	0.50	0.00	<0.002	<0.01	0.003	0.000
16,17,18	<0.01	<0.2	0.08	0.51	0.00	<0.002	<0.01	0.024	0.000
19,20	<0.01	<0.2	0.032	0.44	0.03	<0.002	<0.01	0.023	0.000
21,22,23	<0.01	<0.2	0.59	0.17	0.17	<0.002	<0.01	0.12	0.000
24,25,26	<0.01	<0.2	0.15	0.01	0.02	<0.002	<0.01	0.018	0.000

AVERILL
ENVIRONMENTAL LABORATORY INC

P.O. Box 474, Riverdale Farms
Route 10N, Avon, CT 06001
(203) 677-6283

Lawton S. Averill, Co-Director Paul C. Clark, Organic Supervisor Eric W. Snyder, Inorganic Supervisor Catherine M. Pintavalle, Co-Director

REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartfo

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-955	Sample #1, East Hearth, Inc. 6-16-86.
289-23-956	Sample #2, West Hearth, Inc. 6-16-86.
289-23-955 Comp.	Composite of Sample Nos. 289-23-955 and 289-23-956 by weight.
289-23-955 Comp. E	100 grams of Sample No. 289-23-955 Comp. mixed with distilled water and 400 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hrs. settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-955 Comp. DW	100 grams of Sample No. 289-23-955 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-955 Comp.		289-23-955 Comp. E		289-23-955 Comp. DW
pH of 10% Slurry	10.7	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	41.0
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.015	pH	10.0
		Chromium, Total	46.4		
		Lead	0.06		
		Mercury	less than 0.002		
		Selenium	0.009		
		Silver	0.07		
		pH	9.2		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill
The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-955C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

EPA METHOD 601

289-23-955C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

AVERILL
ENVIRONMENTAL LABORATORY INC

P.O. Box 474, Riverdale Farms
Route 10N, Avon, CT 06001
(203) 677-6283

Lawton S. Averill, Co-Director Paul C. Clark, Organic Supervisor Eric W. Snyder, Inorganic Supervisor Catherine M. Pintavalle, Co-Director

REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartfor

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-957	Sample #3, No. Side Pri. Inc., 6-16-86.
289-23-958	Sample #4, West Side Pri. Inc., 6-16-86.
289-23-959	Sample #5, So. Side, Pri. Inc., 6-16-86.
289-23-960	Sample #6, East Side Pri. Inc., 6-16-86.
289-23-957 Comp.	Composite of Sample Nos. 289-23-957, 289-23-958, 289-23-959 and 289-23-960 by weight.
289-23-957 Comp. E	100 grams of Sample No. 289-23-957 Comp. mixed with distilled water and 400 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-957 Comp. DW	100 grams of Sample No. 289-23-957 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-957 Comp.		289-23-957 Comp. E		289-23-957 Comp. DW
pH of 10% Slurry	10.9	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	0.009	Chromium, Hexavalent	1.1
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.11	pH	10.1
		Chromium, Total	1.1		
		Lead	0.00		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.010		
		pH	5.2		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill
The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-957C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

EPA METHOD 601

289-23-957C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

AVERILL ENVIRONMENTAL LABORATORY INC

P.O. Box 474, Riverdale Farms
Route 10N, Avon, CT 06001
(203) 677-6283

Lawton S. Averill, Co-Director Paul C. Clark, Organic Supervisor Eric W. Snyder, Inorganic Supervisor Catherine M. Pintavalle, Co-Director

REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartford

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-961	Sample #7, East side Sec. Inc., 6-16-86.
289-23-962	Sample #8, No. side Sec. Inc., 6-16-86.
289-23-963	Sample #9, West side Sec. Inc., 6-16-86.
289-23-964	Sample #10, So. side Sec. Inc., 6-16-86.
289-23-961 Comp.	Composite of Sample Nos. 289-23-961, 289-23-962, 289-23-963 and 289-23-964 by weight.
289-23-961 Comp. E	100 grams of Sample No. 289-23-961 Comp. mixed with distilled water and 16 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-961 Comp. DW	100 grams of Sample No. 289-23-961 Comp. mixed with distilled water to a total volme of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-961 Comp.		289-23-961 Comp. E		289-23-961 Comp. DW
pH of 10% Slurry	6.9	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	0.51
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.008	pH	7.3
		Chromium, Total	0.23		
		Lead	0.00		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.003		
		pH	4.9		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-961C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-961C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

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REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartfor

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-965	Sample #11, So. side Ter. Inc., 6-16-86.
289-23-966	Sample #12, No. side Ter. Inc., 6-16-86.
289-23-965 Comp.	Composite of Sample Nos. 289-23-965 and 289-23-966 by weight.
289-23-965 Comp. E	100 grams of Sample No. 289-23-965 Comp. mixed with distilled water and 7.2 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-965 Comp. DW	100 grams of Sample No. 289-23-965 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-965 Comp.		289-23-965 Comp. E		289-23-965 Comp. DW
pH of 10% Slurry	6.3	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	0.68
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.007	pH	7.7
		Chromium, Total	0.56		
		Lead	0.00		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.000		
		pH	5.2		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-965C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-965C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

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REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartfor

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-967	Sample #13, Horiz. Sect. Inc. End, 6-16-86.
289-23-968	Sample #14, Horiz. Sect. Middle, 6-16-86.
289-23-969	Sample #15, Horiz. Sect. Boiler End, 6-16-86.
289-23-967 Comp.	Composite of Sample Nos. 289-23-967, 289-23-968 and 289-23-969 by weight.
289-23-967 Comp. E	100 grams of Sample No. 289-23-967 Comp. mixed with distilled waer and 11.2 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-967 Comp. DW	100 grams of Sample No. 289-23-967 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-967 Comp.		289-23-967 Comp. E		289-23-967 Comp. DW
pH of 10% Slurry	6.5	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	0.48
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.13	pH	6.3
		Chromium, Total	0.50		
		Lead	0.00		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.003		
		pH	5.2		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-967C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-967C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

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REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartfor

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-970	Sample #16, West, Incl. Sec. Inlet Boiler, 6-16-86.
289-23-971	Sample #17, East, 2' up ELPC Inlet Boiler, 6-16-86.
289-23-972	Sample #18, West at cooler ELPC Inlet Boiler, 6-16-86.
289-23-970 Comp.	Composite of Sample Nos. 289-23-970, 289-23-971 and 289-23-972 by weight.
289-23-970 Comp. E	100 grams of Sample No. 289-23-970 Comp. mixed with distilled water and 18 ml.of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-970 Comp.DW	100 grams of Sample No. 289-23-970 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-970 Comp.		289-23-970 Comp. E		289-23-970 Comp. DW
pH of 10% Slurry	8.0	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	1.58
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.08	pH	8.2
		Chromium, Total	0.51		
		Lead	0.00		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.024		
		pH	5.0		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-970C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-970C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

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REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartford

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-973	Sample #19, East 2' Down Duct into Boiler, 6-16-86.
289-23-974	Sample #20, West 2' Up Duct into Boiler, 6-16-86.
289-23-973 Comp.	Composite of Sample Nos. 289-23-973 and 289-23-974 by weight.
289-23-973 Comp.E	100 grams of Sample No. 289-23-973 Comp. mixed with distilled water and 14 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-973 Comp.DW	100 grams of Sample No. 289-23-973 Comp. mixed with distilled water to a total volume of 2000 ml., mmixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-973 Comp.		289-23-973 Comp. E		289-23-973 Comp. DW
pH of 10% Slurry	6.9	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	0.56
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.032	pH	6.4
		Chromium, Total	0.44		
		Lead	0.03		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.023		
		pH	5.2		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-973C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-973C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

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REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartfo

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-975	Sample #21, So. Side Boiler Inlet, 6-16-86.
289-23-976	Sample #22, No. Side Boiler Inlet, 6-16-86.
289-23-977	Sample #23, Bottom Boiler Inlet, 6-16-86.
289-23-975 Comp.	Composite of Sample Nos. 289-23-975, 289-23-976 and 289-23-977 by weight.
289-23-975 Comp. E	100 grams of Sample No. 289-23-975 Comp. mixed with distilled water and 0 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-975 Comp. DW	100 grams of Sample No. 289-23-975 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-975 Comp.		289-23-975 Comp. E		289-23-975 Comp. DW
pH of 10% Slurry	2.3	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	0.00
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.59	pH	2.9
		Chromium, Total	0.17		
		Lead	0.17		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.12		
		pH	2.9		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-975C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-975C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co. 272 Pepe's Farm Rd. , Milford, Ct. 06460

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REPORT ON LABORATORY EXAMINATIONS

To Client: Pratt & Whitney
East Hartford, CT 06108

Date: June 27, 1986

SAMPLE DATA: Collected By: Pratt & Whitney

Samples from Incinerator at Concentrated Waste Treatment Plant, Pratt & Whitney, East Hartford

SAMPLE NO.	DESCRIPTION OF SAMPLE
289-23-978	Sample #24, So. Side Boiler Disch., 6-16-86.
289-23-979	Sample #25, No. Side Boiler Disch., 6-16-86.
289-23-980	Sample #26, Bottom Boiler Disch., 6-16-86.
289-23-978 Comp.	Composite of Sample Nos. 289-23-978, 289-23-979 and 289-23-980 by weight.
289-23-978 Comp.E	100 grams of Sample No. 289-23-978 Comp. mixed with distilled water and 61.6 ml. of 0.5N acetic acid to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.
289-23-978 Comp.DW	100 grams of Sample No. 289-23-978 Comp. mixed with distilled water to a total volume of 2000 ml., mixed for 24 hours, settled and filtered through 0.45 micron filter. Filtrate was tested.

LABORATORY FINDINGS: (milligrams per liter, mg/l, except as noted)

ANALYSIS FOR	SAMPLE NO. 289-23-978 Comp.		SAMPLE NO. 289-23-978 Comp.E		SAMPLE NO. 289-23-978 Comp.DW
pH of 10% Slurry	6.0	Tests are mg/l in Filtrate		Tests are mg/l in Filtrate	
		Arsenic	less than 0.01	Chromium, Hexavalent	0.00
		Barium	less than 0.2	Cyanide, Total	0.000
		Cadmium	0.15	pH	6.3
		Chromium, Total	0.01		
		Lead	0.02		
		Mercury	less than 0.002		
		Selenium	less than 0.01		
		Silver	0.018		
		pH	4.8		

cc: Pratt & Whitney
Att: Kevin Vidmar

Lawton S. Averill

The Averill Environmental Laboratory, Inc.

EPA METHOD 601

289-23-978C

Carbon tetrachloride	ND<20
Chlorobenzene	ND<20
1,2-Dichloroethane	ND<20
1,1,1-Trichloroethane	ND<20
1,1-Dichloroethane	ND<20
1,1,2-Trichloroethane	ND<20
1,1,2,2-Tetrachloroethane	ND<20
Chloroethane	ND<20
2-Chloroethyl vinyl ether	ND<20
Chloroform	ND<20
1,2-Dichlorobenzene	ND<20
1,3-Dichlorobenzene	ND<20
1,4-Dichlorobenzene	ND<20
1,1-Dichloroethylene	ND<20
trans-1,2-Dichloroethylene	ND<20
1,2-Dichloropropane	ND<20
trans-1,3-Dichloropropene	ND<20
cis-1,3-Dichloropropene	ND<20
Methylene chloride	ND<20
Chloromethane	ND<20
Bromomethane	ND<20
Bromoform	ND<20
Bromodichloromethane	ND<20
Trichlorofluoromethane	ND<20

Results are in ug/kg (ppb)

Baron Consulting Co.

EPA METHOD 601

289-23-978C

Dichlorodifluoromethane	ND<20
Dibromochloromethane	ND<20
Tetrachloroethylene	ND<20
Trichloroethylene	ND<20
Vinyl chloride	ND<20

Results are in ug/kg (ppb)

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APPENDIX E

CLOSURE PERFORMANCE STANDARDS

TABLE 1

TARGET CLEANUP LEVELS
WASTE FEED LINE RINSATE SAMPLING

CONSTITUENT	CONCENTRATION (mg/l)
Arsenic[1]	0.05
Barium[1]	1.0
Cadmium[1]	0.01
Chromium[1]	0.05
Copper[2]	1.0
Lead[1]	0.05
Mercury[1]	0.002
Selenium[1]	0.01
Silver[1]	0.05
Cyanide[3]	0.2
Carbon Tetrachloride[1]	0.005
1,1-Dichloroethylene[1]	0.007
Methylene Chloride[4]	0.025
Tetrachloroethylene[4]	0.02
1,1,1-Trichloroethane[1]	0.20
Trichloroethylene[1]	0.005

1. EPA Primary Drinking Water Standard (MCL)
2. EPA Secondary Drinking Water Standard (SMCL)
3. Recommended Contaminant Level (RMCL)
4. Connecticut Department of Health Services - Action Level

TABLE 2

HEALTH BASED RISK LEVELS
CONCRETE CHIP SAMPLING

CONSTITUENT	CONCENTRATION (mg/kg)
Arsenic	0.02
Barium	900
Cadmium	*
Chromium vi	90
Copper	*
Lead	*
Mercury	*
Nickel	300
Selenium	*
Silver	50
Cyanide	300
Carbon Tetrachloride	2.7
1,1-Dichloroethylene	5.8
Methylene Chloride	47
Tetrachloroethylene	69
1,1,1-Trichloroethane	2000
Trichloroethylene	32

Risk levels obtained from RCRA Facility Investigation (RFI) Guidance Document (EPA Publication SW-87-001)

* No risk levels identified

APPENDIX H-2
INTERIUM REPORT
CLOSURE OF BURN-ZOL INCINERATOR

INTERIM REPORT
CLOSURE OF BURN-ZOL INCINERATOR

PREPARED FOR:

UNITED TECHNOLOGIES CORPORATION
PRATT & WHITNEY
400 MAIN STREET
EAST HARTFORD, CT 06108
EPA ID NO. CTD 990672081

PREPARED BY:

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SCI-TECH PROJECT NUMBER 90021

JUNE 1990

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1.0 INTRODUCTION

United Technologies-Pratt & Whitney (P&W) owns and operates the Concentrated Waste Treatment Plant (CWTP), a hazardous waste treatment and storage facility, located at the P&W East Hartford plant. A Burn-Zol hazardous waste incinerator, which was part of the CWTP, is being closed per the closure plan, approved on September 11, 1989 by both the Connecticut Department of Environmental Protection (DEP) and the United States Environmental Protection Agency (EPA), Region I. International Technology Corporation (IT) of Monroeville, PA., was contracted to carry out the closure activities. Sampling, as required by the approved closure plan, was performed by either IT or P&W personnel. All samples collected during closure were analyzed at Connecticut certified Averill Environmental Laboratory, Inc., (Averill) of Plainville, CT. The analytical data were reviewed and validated by Fred C. Hart Associates, Inc., (Hart) of Albany, NY.

The analytical data for samples collected at the end of initial closure activities indicate that two of the waste feed line rinsates have not fully met the closure criteria. Because of this, P&W has requested an extension of the closure period from both DEP and EPA, Region I to allow for additional closure activities. This report describes the closure activities performed to date. This report also contains the specific submittals, which constitute a closure certification. These are discussed in sub-Section 5.4.

2.0 PROJECT DESCRIPTION

Closure of the incinerator is considered to be a partial closure of the overall P&W East Hartford hazardous waste facility. This section identifies the equipment and the ancillary facilities subject to closure and summarizes the closure plan.

2.1 System Description

The approved closure plan authorizes P&W to close the following equipment and facilities in the CWTP.

1. Combustion Chamber
2. Exhaust Stacks (2)
3. Waste Heat Boiler
4. Air Pollution Control Equipment
5. Interconnecting breaching and piping
6. Cyanide feed line
7. Blended oil feed lines(2)
8. Concrete Pad for combustion chamber
9. Concrete Pit of air pollution control equipment
10. Ceiling above the equipment to be closed

The combustion chamber and the exhaust stacks were located outdoors. The remainder of the incinerator train was located indoors. The cyanide and the blended oil waste feed lines are located underground. A site plan, equipment layouts and a flow diagram of the incinerator train and the waste feeds lines are included in Appendix A. Photographs of the incinerator train are included in Appendix B.

2.2 Closure Plan Summary

The final closure plan dated July 28, 1989 as amended on August 17, 1989 was approved on September 11, 1989. The following are the main features of the approved closure plan.

2.2.1 Disposal and Decontamination

a. Any ash from the incinerator, residue from the waste heat boiler, and packing from the scrubber will be removed, containerized, and treated as hazardous waste.

b. Waste feed lines will be decontaminated by flushing until they meet the closure criteria and then they will be abandoned in place. Any rinsate generated from flushing of the lines will be treated as hazardous waste.

c. The entire incinerator train including the air pollution control equipment will be dismantled, cut to shippable sizes and disposed of at a RCRA permitted secure landfill.

d. The concrete slab will be shotblasted or scarified. Any concrete residue will be treated as hazardous waste.

e. The concrete pit for the air pollution control equipment will be hydroblasted. Any rinsate generated will be treated as hazardous waste.

f. The ceiling in the building will be washed by applying a biodegradable cleaning solution with a hand applicator. Any rinsate generated will be treated as hazardous waste.

g. All hand tools that may have come in contact with the incinerator train will be decontaminated by washing. Any rinsate generated will be treated as hazardous waste.

2.2.2 Sampling

a. The final flush from each waste feed line will be sampled.

b. Chip samples will be taken from the concrete slab and the concrete pit.

c. Wipe samples will be collected from the ceiling.

2.2.3 Analysis

a. All samples will be analyzed for presence of the constituents identified in Table 2 of the final closure plan (Appendix C).

b. Concrete chip samples will be analyzed for EP toxicity.

2.2.4 Closure Criteria

a. Appendix C constituent levels in the rinsate must be either below the levels shown in Table 1 of Appendix D or equal to or below the levels in the influent water sample collected prior to flushing.

b. The concrete chip samples must show Appendix C constituent levels either equal to, or below the background levels, or below the levels shown in Table 2 of Appendix D and below the EP Toxicity levels shown in Table 1 of 40 CFR 261.24 in effect on the date of closure approval (September 11, 1989).

c. Appendix C constituent levels in the ceiling wipe samples must be equal to or below the background levels.

3.0 CLOSURE ACTIVITIES

The activities associated with the closure of the Burn-Zol hazardous waste incinerator consist of dismantling, decontamination, disposal and sampling. The logs of daily activities of the IT crew are included in Appendix E. Photographs showing progress of the closure activities are included in Appendix F.

During the closure activities the health and safety plan included in Appendix G was followed. A safety meeting was conducted prior to start of work each day. The lists of attendees and topics covered are included in Appendix H.

3.1 Dismantling

All major components of the incinerator train and interconnecting breaching and piping were dismantled. Refractory from all refractory lined items was removed by hand or with an electric chipping hammer. The shells of all components and the interconnecting breaching and piping were cut into shippable pieces. The concrete pad with footing was excavated and broken up. Debris from dismantling and small equipment pieces were initially staged on plastic sheeting with plastic covers and then placed in covered roll-off containers for disposal. The large equipment pieces were similarly staged and then put on flat bed trailer for disposal. The following is a list of the components dismantled:

1. Combustion Chamber
2. Exhaust Stacks
3. Waste Heat Boiler
4. Air Pollution Control Equipment
5. Interconnecting Breaching and Piping
6. Concrete Pad for Combustion Chamber

3.2 Decontamination

The items decontaminated and the decontamination procedures are noted below.

1. Blended Oil Feed Line (WFL1):

   The line was flushed in sequence tap water, Citrikleen solution (30%) (a biodegradable detergent) and tap water. As the line was not clean, it was then flushed with steam for 7.5 hours followed by Citrikleen solution, and tap water in sequence. The line was capped at both ends.

2. Blended Oil Feed Line (WFL2):

   The line was found plugged. It was flushed with steam for 6 hours. It was then flushed in sequence with tap water, Citrikleen solution and tap water similar to WFL1. It was then flushed again with steam for six hours and Citrikleen solution and tap water in sequence. The line was capped at both ends.

3. Cyanide Feed Line (WFL3):

   The cyanide line decontamination was similar to WFL1, except a 25% sodium hydroxide solution was used instead of Citrikleen solution during the initial cleaning. The line was capped at both ends.

4. Concrete Pit:

   The concrete pit was decontaminated by steam cleaning.

5. Ceiling:

   The ceiling was hand sprayed with Citrikleen solution and wiped with disposable lint-free cloth.

6. Tools:

   The tools used in closure were steam cleaned.

Rinsates from all decontamination operation were collected in 55 gallon drums.

3.3 Disposal

The types of waste materials and disposal methods from this closure are noted below. For disposal purposes, the waste materials were treated as hazardous waste.

1. Debris and Small Equipment Pieces:

   These were put in four roll-off containers which were transported off-site by licensed hazardous waste transporters to the RCRA permitted secure landfill operated by Chemical Waste Management, Inc., at Emelle, Alabama under the following hazardous waste manifest numbers:

   CWMA 476051
   CWMA 476052
   CWMA 476055
   CWMA 476056

   The first two containers were shipped on December 1, 1989 and the last two on December 8, 1989. Copies of manifests, receipts and disposal certificates are included in Appendices I, J, and K, respectively.

2. Large Equipment Pieces:

   These were put on a flat bed trailer and shipped to the same disposal facility as above by a licensed hazardous waste transporter under hazardous waste manifest number CWMA 476053 on December 4, 1989. Copies of manifest, receipt and disposal certificate are included in Appendices I, J, and K, respectively.

3. Rinsates:

   The collected rinsates were transferred from 55 gallon drums to bulk tanks containing similar and compatible liquid hazardous waste streams. These bulk waste streams are routinely sent off site for disposal and/or treatment at properly licensed disposal and/or treatment facilities.

3.4 Sampling

The following samples were collected per the approved closure plan.

1. Final rinsate from WFL1
2. Final rinsate from WFL2
3. Final rinsate from WFL3
4. Influent tap water
5. Concrete chip samples from the pit
6. Wipe samples from the decontaminated ceiling
7. Wipe samples from background ceiling area

The sampling methodology and the analytical results are discussed in more detail in Section 4.

4.0 SAMPLING AND ANALYSIS

During and at the end of closure activities various samples were collected to assess the completeness of these activities. The samples were collected by either Mr. Jacques Hill of IT or Mr. Scott Singer of P&W. The collected samples were sent under full chain-of-custody to Averill for analysis. Sampling logs and raw analytical data are included in Appendices L and M respectively. The analytical results were reviewed and validated by Hart. The validation report is included in Appendix N. Only the final sampling program and the validated data from the analyses of the final samples are presented in this section.

4.1 Waste Feed Lines

The second and final round of waste feed line sampling was performed on December 7, 1989. IT coordinated sampling activities and the first sample collected was an influent tap water sample from the wax building. The water was activated at 1150 hours and allowed to flow through a new length of garden hose for 5 minutes prior to sample collection. The sample was collected directly from the end of the garden hose.

Waste feed line flushing operations were initiated at 1155 hours. The flushing procedures were modified by flushing each waste feed line with Citrikleen solution, and tap water in sequence. An average of 25 gallons of rinsate was collected from each line prior to sample collection.

The samples were collected directly into the laboratory bottles from a new length of garden hose on each line. For this round of sample collection, the samples were labelled WFL-1A, WFL-2A, WFL-3A for each respective feed line. In addition, a blind duplicate sample was collected from waste feed line WFL2 and was labelled WFL-4A.

The QA/QC samples included a field blank collected on November 15, 1989 during the initial round of sampling and a trip blank. The field blank was prepared on November 15, 1989 at 1540 hours by pouring deionized water into sample containers. The trip blank was prepared by Averill and accompanied the sample bottles from and to Averill.

Following sample collection, all sample jars were labelled, transferred to an iced cooler and hand delivered under full chain of custody to Averill for analysis.

The validated analytical results are presented in Table 4-1. The results indicate that the levels of Appendix C constituents in rinsate from the cyanide feed line (Sample WFL-3A) were below the target levels. Results from both blended fuel lines (Samples WFL-1A, WFL-2A and WFL-4A) indicate that levels of all inorganic Appendix C constituents were below the target levels.

TABLE 4-1

WASTE FEED LINE SAMPLE ANALYSIS (mg/l)

Parameter	Target Clean Level	SAMPLE NUMBERS Influent	WFL #1A	WFL #2A	WFL #3A	WFL #4A*
Metals						
Arsenic	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
Barium	1.0	<0.01	0.01	<0.01	0.01	<0.01
Cadmium	0.01	<0.006	<0.006	<0.006	<0.006	<0.006
Chromium	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium VI	--	<0.01	<0.01	<0.1	<0.01	<0.01
Copper	1.0	0.21	0.21	0.1	0.09	0.09
Lead	0.05	<0.1	<0.1	<0.1	<0.01	<0.01
Mercury	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	--	<0.02	<0.02	<0.02	<0.02	<0.02
Selenium	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
Cyanide						
Total	0.2	<0.005	<0.005	0.12	<0.005	0.21
Volatile Organics						
Methylene Chloride	0.025	<0.005	0.058	<0.01	<0.005	<0.01
1,1 Dichloroethene	0.007	<0.005	<0.005	<0.01	<0.005	<0.01
1,1,1 Trichloroethane	0.2	<0.005	0.012	0.022	<0.005	0.016
Carbon Tetrachloride	0.005	<0.005	<0.005	<0.01	<0.005	<0.01
Trichloroethene	0.005	<0.005	0.122	<0.01	<0.005	<0.01
Tetrachloroethylene	0.02	<0.005	0.048	3.4	<0.005	3.7

* duplicate of WFL #2A

4.2 Ceiling

A total of six wipe samples were collected on December 7, 1989. Four of the wipe samples (CW-1, CW-2, CW-3, CW-4) were collected from an area of the ceiling which underwent decontamination. The remaining two samples (CW-5, CW-6) were collected from outside the decontamination zone to represent background conditions. Figure 4.1 shows the layout of the sample locations.

Sampling methodology followed the procedures per the approved closure plan. Vinyl acetate templates were used at each location to outline the sample area. The template dimensions measured 5 X 20 cm thereby totalling $100cm^2$. Templates were affixed to the ceiling using small magnets. Sample wipes were transferred directly into the sample jars following sample collection, and the sampling team changed gloves at each sample location to ensure sample integrity.

At a given sample location, a total of three templates were positioned side by side following the contour of the corrugated ceiling. The first template was sampled for Appendix C organic constituents, the second for cyanide and the third for Appendix C metals. Methanol, dilute sodium hydroxide solution, and dilute nitric acid solution were the respective extraction solvents. During VOCs sampling it was observed that the methanol was stripping the paint off the ceiling. No such stripping was observed during cyanide or metals sampling.

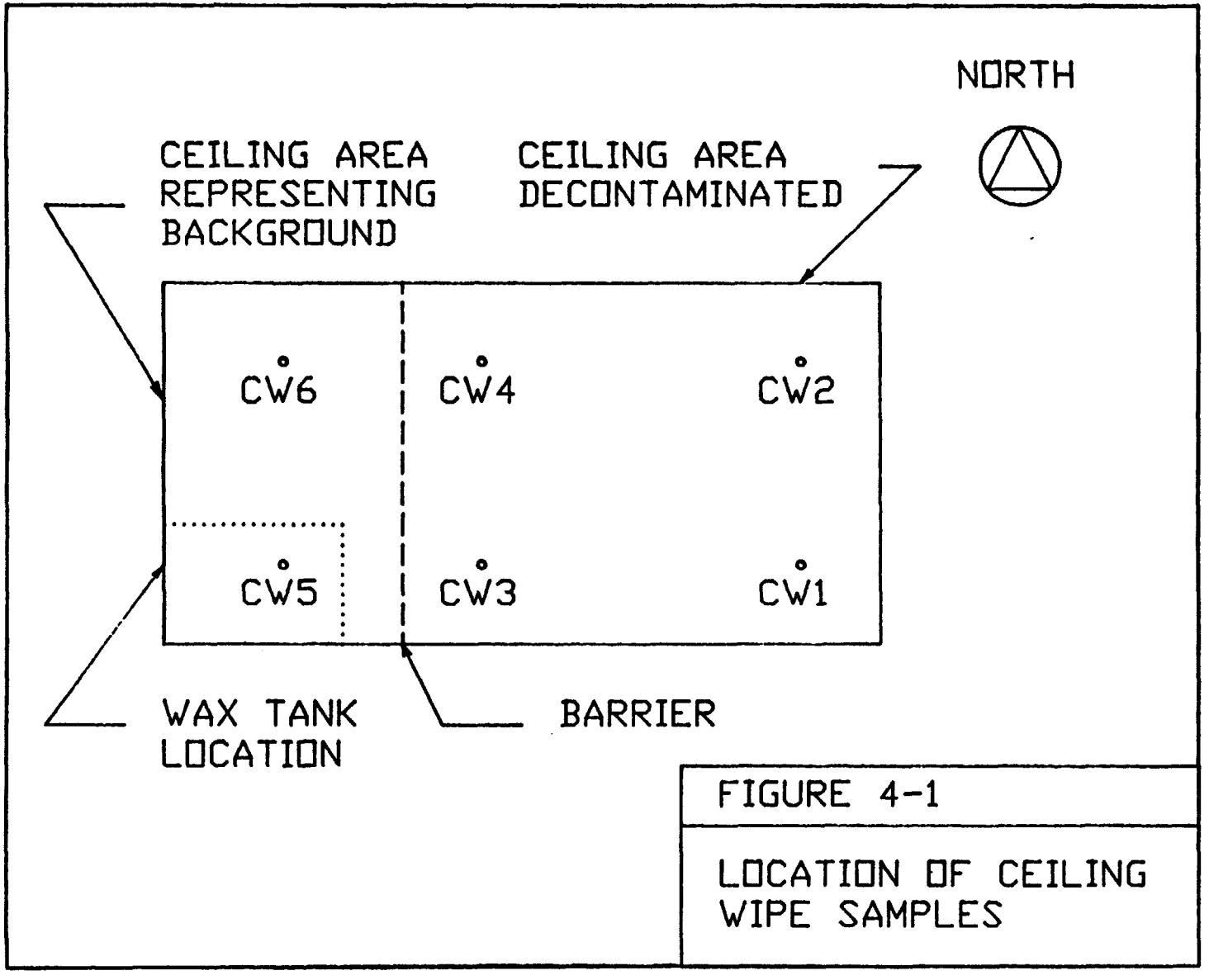

FIGURE 4-1

LOCATION OF CEILING WIPE SAMPLES

Specific sampling procedures for each set of parameters consisted of performing three wipes. The first two wipes were performed wet by moistening the wipe with the appropriate extraction solvent. The third wipe was performed dry to absorb any residual extraction solvent from the sample area.

QA/QC sampling consisted of one field blank collected at location CW-1. This sample was prepared in the same manner as the other samples except no wiping of the ceiling was performed.

Following sample collection, all sample jars were labelled, transferred to an ice cooler and hand delivered under full chain of custody to Averill for analysis.

The validated analytical results are presented in Table 4-2. The results indicate that the Appendix C constituent levels shown by samples CW-1, CW-2, CW-3 and CW-4 match the corresponding constituent levels shown by background samples CW-5 and CW-6. The only exception was the 1,1 dichloroethene level in sample CW-2. As there were not any incinerator train components or waste feed lines near the location where sample CW-2 was collected, this level can not be attributed to the equipment undergoing closure. Also, this reported level is inconsistent with non-detectable levels reported for other locations; therefore, the value is considered an analytical anomaly and was rejected.

TABLE 4-2

CEILING WIPE SAMPLE ANALYSIS (micro g/l00cm2)

Parameter	SAMPLE NUMBERS CW-1	CW-2	CW-3	CW-4	CW-5*	CW-6*
Metals						
Arsenic	<47.5	<47.5	<47.5	<47.5	<47.5	<47.5
Barium	>14000	>14000	>14000	>14000	>14000	>14000
Cadmium	<45	<45	<45	<45	<45	<45
Chromium	<25	<25	<25	<25	<25	<25
Chromium VI	--	--	--	--	--	--
Copper	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
Lead	<130	<130	<130	<130	<130	<130
Mercury	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	< 5	< 5	< 5	< 5	< 5	< 5
Selenium	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Silver	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
Cyanide						
Total	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Volatile Organics						
Methylene Chloride	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9
1,1 Dichloroethene	<0.05	0.14	<0.05	<0.05	<0.05	<0.05
1,1,1 Trichloroethane	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
Carbon Tetrachloride	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Trichloroethene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tetrachloroethylene	<1.05	<1.05	<1.05	<1.05	<1.05	<1.05

* background

4.3 Concrete

A total of six concrete chip samples were collected on December 7, 1989. Five of the samples were collected to assess the completeness of pit decontamination. A sixth sample was collected as a background sample. Figure 4.2 shows the sample locations.

Samples CS-1, CS-2, CS-3, CS-4, and CS-5 were collected from each wall of the pit and the floor. Wall samples were collected approximately 2.5 feet above the pit floor in the center of the wall. The floor sample was collected from the center of the floor.

The background sample CS-6 was collected in the same pit as the decontamination samples. This sample was collected immediately below the top of the pit wall near the southwest corner of the pit.

All concrete chip samples were collected by IT representative, Mr. Jacques Hill using a cleaned hand chisel and a hammer. Dislodged chips were allowed to fall on a fresh piece of polyethylene sheeting. Using a pair of new latex gloves, the sampler then collected the chips and transferred them directly into the sample jars.

Following sample collection, all sample jars were labelled, transferred to an iced cooler and hand delivered under full chain of custody to Averill for analysis.